UPPER CLEAR CREEK MITIGATION BANK MITIGATION BANKING INSTRUMENT

PIERCE COUNTY, WASHINGTON



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And

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MITIGATION BANKING INSTRUMENT

Upper Clear Creek Mitigation Bank

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This Mitigation Banking Instrument (hereinafter, the "Instrument") regarding the establishment, use, operation, and maintenance of the Upper Clear Creek Mitigation Bank (hereinafter, the

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"Bank") is made and entered into by and among Port of Tacoma (hereinafter, the "Sponsor"), the U.S. Army Corps of Engineers (hereinafter, the "Corps"), the Washington State Department of Ecology (hereinafter, "Ecology") and National Oceanic Atmospheric Administration National Marine Fisheries Service (hereinafter, "NMFS"), (hereinafter, collectively, the "Parties"), with reference to the following: I. PREAMBLE

A. Purpose: The purpose of this Instrument is to specify responsibilities for the establishment, use, operation, and maintenance of the Bank. It consists of this "Basic Agreement" establishing the central obligations assumed and consideration provided by each Party, as well as Appendices (hereinafter, the "Appendices") that establish the detailed Bank implementation plan, including site-specific conditions, standards and procedural requirements applicable to the Bank. The terms and provisions of the Appendices are incorporated into the Instrument. The Bank will provide compensatory mitigation for unavoidable impacts to waters of the United States and waters of the State, including wetlands, as well as adverse effects on aquatic habitat including habitat for both fish listed under the Endangered Species Act (ESA) and non-listed fish, and to other natural resources that result from activities authorized by Federal, State, and local authorities, when use of the Bank has been specifically approved by the appropriate regulatory agencies.

B. Locations and Ownership of Parcels: Whereas, the Sponsor owns approximately 41.35 acres of land of which 28.64 acres is intended for Bank establishment and 12.59 acres has been designated to fulfill obligations under the EPA consent decree identified in Section I.D. below ("EPA Consent Decree"), and of which approximately 0.12 acres is not included in either project. The Bank is located near the Puyallup River in unincorporated Pierce County, Washington, between the cities of Tacoma and Puyallup, at 3714 and 4014 Gay Rd East, Tacoma WA 98443, portions of Pierce County Tax Parcel Nos. 0320141001 and 0320141086 in Sections 13 and 14 of Township 20 North, Range 3 East, Willamette Meridian. See Table 1 below for a summary of the property information, including the parcel acreage, as well as a breakdown of the acreage constituting each tax parcel that is attributable to Bank establishment, and that attributable to the fulfillment of obligations under the Consent Decree. See Appendix A for description and map.

Parcel	Zoning	Parcel	EPA Site	Bank
Number		Acreage	Acreage	Acreage
0320141001	Agricultural Resource	25.53	12.22	13.19
0320141086	Agricultural Resource	15.82	0.37	15.45
	Total Acreages:	41.35	12.59	28.64

Note: 1) Parcels owned by Port of Tacoma. Approximately 0.12 acres of Parcel 0320141001 is not included in either the EPA site or the Bank site.

C. <u>Project Description</u>: Whereas, the Sponsor has expressed intent to re-establish, rehabilitate and enhance approximately 28.64 acres of aquatic and associated upland habitat at the Bank, in accordance with the provisions of this Instrument, and to then maintain the Bank in accordance with the provisions of this Instrument. The Bank is located within Water Resource Inventory Area (WRIA) 10 (Puyallup – White) at approximately Lat. 47.224475 N, Long. 122.380150 W. The Bank is projected to, among other purposes, provide the re-establishment of 4.18 acres of floodplain wetland mosaic, rehabilitation of 22.05 acres of floodplain wetland mosaic, preservation of 0.80 acres of Clear Creek, and enhancement of 1.61 acres of forested upland, as detailed in Appendices A and B of this Instrument.

The Bank site encompasses areas that are excluded from the credit-generating area of the Bank, consisting of a variable width bank buffer (ranging from 50 to 100 feet) as detailed in Appendices A and B. The buffers around the perimeter of the site are based upon current and anticipated landuse intensities on adjacent properties and the risk of impacts to the Bank from those activities. The Bank is comprised of 28.64 acres of area to be re-established, rehabilitated, enhanced, and preserved, and includes 22.34 acres of creditable area and 6.30 acres of non-creditable buffer area.

Table 2 – Bank Activities

Mitigation Activity	Habitat Type	Area (acres)
Re-establish	PFO/PSS/PEM mosaic, channels, and alcoves	4.18
Rehabilitate	PFO/PSS/PEM mosaic, channels, alcoves and	22.05
	PAB ponds	
Enhance	Upland	1.61
Preserve ¹	Baseline Clear Creek	0.80
TOTAL		28.64

 ¹Clear Creek is located in the buffer area and does not generate credit.

D. <u>Bank Overview</u>: Whereas, the general goal of the Bank establishment is to create mitigation credit to meet future compensatory mitigation requirements, by including a wide range of habitat types (freshwater stream/riparian, and wetlands) and engaging in a wide range of wetland mitigation and fish habitat conservation (primarily re-establishment and rehabilitation), to compensate for both impacts to aquatic resources and fish. The Bank is a freshwater site that supports Endangered Species Act (ESA) listed and non-listed salmonids and other fish species. The Bank also supports other wildlife including migratory and non-migratory birds.

- 1 A summary of the primary ecological goals and construction activities planned for the Bank 2 in general are stated below. Specific details for the current Bank are provided in Appendix B.
- 3 Restore ecological processes and structures including, stream, wetland, and floodplain 4 connections.
- 5 Realign stream channels, reestablish floodplain connectivity, and rehabilitate riverine wetlands 6 and off-channel ponds.
- 7 Establish diverse hydrogeomorphic conditions and vegetation zones, including emergent, 8 scrub-shrub, and forested wetlands.
- 9 Re-establish and rehabilitate wetland habitat to pre-impact conditions to the maximum extent 10 possible.
- 11 Maximize wetland area and functions.
- 12 Establish multiple native wetland plant communities and functional native vegetated upland 13 habitat.
- 14 Protect existing upland forested areas to the extent possible and provide additional forested upland area. 15
- 16 Restore fish and wildlife habitat, structure, and function.
- 17 Manage invasive and non-native species.
- 18 The Bank is one part of a two-part combined habitat improvement site referred to as the overall
- 19 Upper Clear Creek Mitigation Site (UCCMS). The overall UCCMS is a habitat improvement
- 20 project on approximately 41 acres of land in the Clear Creek drainage, located between the cities
- 21 of Puyallup and Tacoma on the southwest side of the Puyallup River valley. The overall UCCMS
- 22 includes as interrelated components both a 12.59-acre Environmental Protection Agency (EPA)
- 23 Mitigation Site (in support of a Consent Decree in United States v. Port of Tacoma, et al., No. 11-
- 24 cv-05253 [W.D. Wa.]) (EPA site) located directly adjacent to the mitigation Bank to the north, and
- 25 a 28.64-acre mitigation Bank, and has largely already been built to accommodate the timelines for
- the EPA site. This Instrument only pertains to the 28.64-acre mitigation Bank portion of the 26
- 27 UCCMS site and not to the 12.59-acre EPA site. However, several components of the EPA site
- 28 are discussed in this Instrument and Appendices to provide context for Bank restoration and
- 29 ecological function, and to document the synergy between the two areas and describe how
- restoration activities at each site will contribute to functional lift across both sites. Additional 30
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- information on which portions of the site are included in the Bank site or EPA site, and the
- 32 functional relationship between the Bank site and the EPA site, is contained in Section 1.1 of
- 33 Appendix A of this Instrument.
- 34 The Bank is located in unincorporated Pierce County along Clear Creek, approximately 0.7 river
- mile (RM) upstream of the confluence with the lower Puyallup River. The project includes habitat 35
- improvements to Clear Creek, which is a perennial, fish-bearing stream, and to the floodplain of 36
- 37 Clear Creek, including wetland habitat.
- 38 Natural floodplain conditions will be restored by realigning Clear Creek through re-established
- 39 and rehabilitated Category I riverine forested wetlands within the floodplain of Clear Creek and

the lower Puyallup River. Removal of substantial fill, including the side-cast berm levee and

- 2 throughout the reed canarygrass monoculture areas within the floodplain, combined with
- 3 excavation of multiple new floodplain channels through the reconnected floodplain wetlands in
- 4 both the Bank and EPA site, will reestablish connectivity to Clear Creek, improve fish habitat
- 5 conditions by providing in- and off-channel foraging and refuge habitats, and increase floodwater
- 6 storage capacity in the Clear Creek basin. In addition, the project will re-establish and rehabilitate
- 7 floodplain wetland processes with a mosaic of emergent, scrub-shrub and forested conditions
- 8 including over 40 species of native vegetation. Re-establishment, rehabilitation, and enhancement
- 9 measures also include proactive management of invasive vegetation while native plant species
- 10 become established. The plant species are selected to improve the water quality and habitat
- 11 functions of the site.
- 12 The Bank will restore critical riverine watershed processes that have been highly altered by past
- land uses. The aquatic and riparian habitat of Clear Creek was highly disturbed by agricultural
- practices, flood control practices, and residential landscaping, which resulted in a channelized,
- ditch-like stream with minimal in-stream habitat complexity or riparian community. The historic
- 16 removal of meander bends and construction of the side-cast berm levee eliminated fish refuge
- areas, disconnected the stream from natural interactions with the floodplain, and created fish
- stranding hazards during flood events. Previous land use practices resulted in removal of large
- 19 areas of native riparian vegetation. Most of the ditched stream channel and altered floodplain are
- 20 colonized by invasive species such as Himalayan blackberry and reed canarygrass. Additional
- 21 documentation of wetland functions impaired by historic alterations to the Bank is contained in
- 22 Appendix A.
- 23 Three types of wetland mitigation activities will be completed at the Bank including wetland re-
- 24 establishment, wetland rehabilitation, and forested upland enhancement. Wetland re-
- establishment will be achieved in the northeastern portion of the Bank by fill excavation and along
- 26 the western edge of the Bank by excavation and removal of the side-cast berm levee of the right
- bank of Clear Creek. Wetland re-establishment will be achieved by removing fill to re-establish
- an elevation similar to the existing adjacent wetland. The site will include habitat features (e.g.,
- 30 hummocks, 118 large wood structures) and the site will include plantings with 13 native tree
- 30 species (including five coniferous tree species), 19 native shrub species, three native groundcover
- 31 species and seven native emergent species.
- 32 Wetland rehabilitation will occur throughout the pre-existing wetland. The primary actions in
- 33 support of wetland rehabilitation will involve returning riverine functions to the site by reversing
- 34 human alterations to the wetland including removing the side-cast berm levee, removing drain
- 35 tiles, filling the historic drainage ditch, removing the associated double culvert, and re-meandering
- multiple channels of Clear Creek through the wetland and back through the historic floodplain. In
- 37 addition, rehabilitation actions will include constructing riverine floodplain ponds and floodplain
- 38 channels, removing and controlling reed canarygrass, installing a diverse, multi-story assemblage
- 39 of native tree, shrub, groundcover, and emergent species, and constructing habitat features
- 40 including coniferous, forested upland hummocks and complex large wood structures. These
- 41 actions will reconnect the Bank wetland with Clear Creek, and will restore a complex mosaic of
- 42 instream habitat and wetland and upland vegetation communities, which will provide diverse niche

- habitats for native fish and wildlife species within the watershed. Additional details regarding wetland rehabilitation to be conducted at the Bank are contained in Appendix B.
 - Forested upland enhancement (110 feet wide) will be conducted in the northeastern portion of the Bank where rural residential uses occur adjacent to the Bank. Upland enhancement measures will include removing invasive vegetation and planting native grasses, shrubs and trees that will mature into a forested community.

E. <u>Interagency Review Team</u>: Whereas, in consideration of the establishment and maintenance of the Bank, the Interagency Review Team (IRT) is willing to award compensatory mitigation credits in the form of aquatic resource credits and fish conservation credits, in accordance with the procedures outlined in this Instrument. These Bank credits will be made available to serve as compensatory mitigation pursuant to applicable Federal and Washington State laws and regulations. The Corps and Ecology serve as Co-Chairs of the IRT. The IRT is the group of Federal, State, tribal, and local agencies that has reviewed, and will advise the Co-Chairs regarding, the establishment and management of the Bank pursuant to the provisions of the Instrument.

NOW, THEREFORE, the Parties agree to the following:

II. LEGAL AUTHORITIES

A. <u>Authorities</u>: The establishment, use, operation, and maintenance of the Bank shall be carried out in accordance with the following principal authorities.

1. Federal:

a. Clean Water Act (33 USC §§ 1251 et seq.)

b. Rivers and Harbors Act of 1899 (33 USC § 403)

 c. Regulatory Programs of the Corps of Engineers, Final Rule (33 CFR Parts 320-332)

d. U.S. Army Corps of Engineers Regulatory Guidance Letter 05-1, Guidance on Use of Financial Assurances, and Suggested Language for Special Conditions for Department of the Army Permits Requiring Performance Bonds, U.S. Army Corps of Engineers, February 14, 2005

e. Guidelines for the Specification of Disposal Sites for Dredged and Fill Material ("404(b)(1) Guidelines," 40 CFR Part 230)

f. National Environmental Policy Act (42 USC §§ 4321 et seq.)

1 2 3	E .	Quality Procedures for Implementing al Policy Act (40 CFR Parts 1500)
4 5	h. Executive Order 11990 (Pr	otection of Wetlands)
6 7	i. Executive Order 11988 (Pr	otection of Floodplains)
8 9	j. Executive Order 13112 (In	vasive Species)
10 11	k. Fish and Wildlife Coordina	ation Act (16 USC §§ 661 et seq.)
12 13		Mitigation Policy (46 FR 7644-7663
14 15	1981)	6 170 C 00 4 504
16 17	m. Endangered Species Act (1	-
18 19	n. Magnuson-Stevens Fishery (16 USC §§ 1801 et seq.)	Conservation and Management Ac
20 21	o. National Historic Preservat	ion Act, as amended (16 USC § 470)
22 23 24	p. Coastal Zone Management	Act (16 USC § 1451 et seq.)
24 25 26	2. State of Washington:	
20 27 28	a. Washington Water Pollution	on Control Act, RCW 90.48 et seq.
29 30	b. State of Washington Wetla (RCW 90.84)	nds Mitigation Banking Statute
31 32 33	c. Washington State Rule on 173-700, Wetland Mitigation	Wetland Mitigation Banking (WAC on Banks)
34 35 36 37	d. Washington State Enviror 43.21C and WAC 197-11)	nmental Policy Act ("SEPA" RCW
38 39	e. Growth Management Act (RCW 36.70A)
40 41	f. Washington State Hydraul and Hydraulic Permit Appr	ic Code (RCW 77.55, WAC 220-660 roval)
42 43 44	g. Washington State Shoreli WAC 173-27 as amended)	ne Management Act (RCW 90.58
45 46	h. Washington State Salmon	Recovery Act (RCW 77.85)

j. Executive orders 89-10 and 90-04, Protection of Wetlands

III. ESTABLISHMENT OF THE BANK

A. <u>Permits:</u> The Sponsor shall obtain all appropriate environmental documentation, permits and other authorizations needed to establish and maintain the Bank, prior to the award of any Bank credits. Compliance with this Instrument does not fulfill the requirement, or substitute, for such authorizations. Local authorizations and permits include, but are not limited to, Pierce County approvals, permits, and authorizations issued under the statutory and regulatory provisions listed in the Appendices of this Instrument.

Bank Site Establishment: The Sponsor agrees to establish the Bank as described in Appendix B and to satisfactorily accomplish all performance standards reflected in Appendix C. In recognition thereof, compensatory mitigation credits will be awarded to the Sponsor in accordance with the procedures and schedules prescribed in the Appendices, particularly in Appendices C and D. In establishing the Bank, deviations from the prescribed Bank development plan and design, including deviations from any performance standards, may only be made with the prior approval of the Corps and Ecology, acting with the concurrence of NMFS when fish conservation credits are involved, and in consultation with the other members of the IRT. To propose modifications to the Bank development plan, the Sponsor shall submit a written request to the Corps and Ecology. Documentation of implemented modifications shall be made consistent with Article VI.B.2. of this Instrument. The Establishment Period of the Bank is defined in Article IV.K.

C. Financial Assurance Requirements: The Sponsor intends to satisfy its obligations under this Instrument by obtaining sufficient funding to carry out all its acquisition, design, development, monitoring, and maintenance responsibilities underlying the establishment and initial functionality of the Bank, as well as its Long-Term Management and Maintenance actions prescribed in Article IV.M.1 and the Sponsor hereby provides an unqualified commitment to obtain, budget, and expend all necessary funding to fulfill these obligations, including any applicable contingency activities and remedial actions pursuant to Article IV.H. and Appendix F, Section 4.0. This funding commitment is unconstrained by any considerations of restriction on future commitment of appropriated public funds that the Sponsor may apply to the obligations arising under this Instrument. No mitigation credit sale revenue may be expended in execution of any of the Sponsor's obligations prescribed under this Instrument, to include without limitation Bank establishment, management, or remedial action activities.

D. Real Estate Provisions: All real property to be included within the Bank is presently owned in fee simple by the Sponsor. The Sponsor shall burden the title to the Bank real property through the grant of a conservation easement, pursuant to the provisions of Appendix G, Section 1.0. The conservation easement must be approved, initiated, and recorded pursuant to Appendix G, Section 1.0, prior to the award of any Bank credits and before any construction or implementation activities (other than monitoring and maintenance of existing conditions and improvements) may be conducted on-site during the establishment period of the Bank, as defined in Article IV.K. Any construction or implementation activities conducted on-site prior to the

inception of the establishment period (other than monitoring and maintenance of existing conditions and improvements) must cease as of the effective date of this Instrument pursuant to Article VI.B.1., until an approved conservation easement is recorded. The Corps and Ecology will notify the Sponsor that construction and implementation activities are authorized to commence, by granting the initial award of Bank credits in recognition of meeting all performance standards under Objective 1, pursuant to Appendix D.

IV. OPERATION OF THE BANK

 A. <u>Service Areas</u>: The Bank is approved to provide compensatory mitigation for impacts to the Waters of the United States and waters of the State, including wetlands and other aquatic habitat resources, including habitat for ESA-listed and non-listed fish, within the Service Areas specific to each mitigation type. A detailed description and map of the Service Areas are included in Appendix E.

1. The Bank may be used to compensate for an impact that occurs within the appropriate Service Area if specifically approved by the regulatory agency(ies) that have jurisdiction over that impact, pursuant to the procedures and criteria prescribed in Appendix E.

a. The Service Area for Universal Credits includes a portion of WRIA 10. The portions of WRIA 10 that are excluded from the service area are; marine open-water, areas above the 2,100-foot elevation contour, the White River, and Muckleshoot Indian Tribe-owned lands. See Appendix E for additional details.

b. The Service Area for the use of DSAY Credits includes portions of the Puyallup River Watershed (WRIA 10) and portions of Commencement Bay marine environment in WRIAs 10 and 12. The portions of WRIA 10 that are excluded from the service area are; marine waters beyond 0.25 miles from the shoreline, the White River Basin, and Muckleshoot Indian Tribeowned lands. The only portion of WRIA 12 that is included in the service area is marine waters within 0.25 miles of the shoreline between Jack Hyde Park and the boundary with WRIA 10. See Appendix E for additional details.

2. In exceptional situations, the Bank may be used to compensate for an impact that occurs outside of the Service Area if specifically approved by the regulatory agency(ies) having jurisdiction over that impact and by the Corps and Ecology, acting with the concurrence of NMFS when fish conservation credits are involved, and in consultation with the other members of the IRT pursuant to the procedures and criteria prescribed in Appendix E, Section 4.0. If the Corps and/or Ecology determine that the Sponsor has sold, used, or transferred Bank credits at any time to provide compensatory mitigation outside of the Service Area without prior approval, the Corps and/or Ecology, in consultation with the IRT, may direct that the sale, use or other transfer of Bank credits immediately cease, and will determine, with the concurrence of NMFS when fish conservation credits are involved, and in consultation with the other members of the IRT, the Sponsor, and the appropriate regulatory authority, what remedial actions are necessary to correct

the situation and will direct their performance prior to the award of any additional Bank credits. Notwithstanding the fact that ceasing sale, use, or other transfer of Bank credits may have been required, unless this Instrument is terminated pursuant to Article IV.J. or VI.B., the Sponsor shall remain responsible for the timely and effective achievement of all the Objectives and Performance Standards mandated in Appendix C.

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B. Access to Bank Site: The Sponsor will allow, or otherwise provide for, access to the Bank site by members of the IRT or their agents or designees, as reasonably necessary for the purpose of inspection, compliance monitoring, and remediation consistent with the terms and conditions of this Instrument and the Appendices, throughout the periods of Bank establishment, operational life, and long-term management and maintenance. Inspecting parties shall provide the Sponsor reasonable prior notice of a scheduled inspection, and shall not unreasonably disrupt or disturb activities on the property.

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Availability and Sale, Transfer, or Use of Bank Credits: Subject to the **C**. documentation and scheduling provisions of Appendix D, Section 1.0, the Sponsor may submit to the IRT written evidence that particular performance standards have been achieved. If the Corps and Ecology, with the concurrence of NMFS when fish conservation credits are involved, and after consulting with the other members of the IRT and the Sponsor, concur that certain performance standards have been achieved in full, the Corps and Ecology will respond in writing to the Sponsor that the Bank credits associated with those performance standards are available for sale, transfer, or use by the Sponsor as compensatory mitigation for its own activities causing adverse impacts to the aquatic environment. Each instance of sale or any other transfer of Bank credits to a third party shall be reflected in a credit transaction agreement, retained by the Sponsor and made available for Corps and/or Ecology review, as well as for NMFS review when fish conservation credits are involved. Each such credit transaction agreement must include the name, address, and telephone number of the purchaser or transferee. Each transaction agreement that is associated with a permit must also indicate the permit number of the impacting project, the number and types of Bank credits involved in the transaction, and must expressly specify that the Sponsor, and its successors and assigns, assume legal responsibility for accomplishment and maintenance of the transferee's compensatory mitigation requirements associated with the impacting project, upon completion of the credit transaction. Each credit transaction agreement that is associated with a permit shall be recorded with the county auditor. A copy of the recorded transaction agreement shall be provided to the Corps and Ecology.

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D. <u>Credit Deficit or Fraudulent Transactions</u>: If the Corps and/or Ecology determine at any point that the Bank is operating at a deficit, or has engaged in fraudulent transactions in the sale, use, or other transfer of Bank credits, the Corps and/or Ecology will cease the award of, and will direct the Sponsor to immediately cease sale, use, or other transfer of, Bank credits. The Corps and/or Ecology will determine, in consultation with the IRT and the Sponsor, what remedial actions are necessary to correct the situation and will direct their performance prior to the award of any additional Bank credits.

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E. Provisions For Use of the Bank Areas: The Corps and/or Ecology may consider the Sponsor as being in material default of a provision of this Instrument and proceed accordingly

1. The grant of additional easements, rights of way, or any other property interest in the Bank without written notification to the Corps and Ecology in accordance with Article IV.N.

2. The use, or authorization of the use, or suffering the use of any areas within the Bank for any purpose that is contrary to the provisions of this Instrument or the conservation easement, or which interferes with the conservation purposes of the Bank.

F. <u>Maintenance Provisions</u>: Following achievement of the performance standards, the Sponsor agrees to perform all necessary work to maintain those standards as prescribed in Appendix F, Section 5.0.

G. <u>Monitoring Provisions</u>: The Sponsor agrees to perform all necessary work, pursuant to Appendix F, to monitor the Bank during the establishment period to demonstrate compliance with the performance standards established in Appendix C.

H. Contingency Plans/Remedial Actions: In the event the Bank fails to achieve one or more of the performance standards within the specific time schedule delineated in Appendix D, the Sponsor shall develop necessary contingency plans and implement appropriate remedial and monitoring actions for the Bank as specified in Appendix F, Section 4.0, to attain those project objectives and performance standards. Prior to implementing any remediation, supplemental monitoring, or other corrective measures, the Sponsor shall obtain approval of the contingency plans from the Corps and Ecology. The Corps and Ecology will obtain the concurrence of NMFS when fish conservation credits are involved, and will consult with the other members of the IRT prior to approval of the plans. All appropriate environmental documentation, permits, and other authorizations needed to implement the contingency plan or take remedial action shall be obtained by the Sponsor. In the event the Sponsor fails to implement necessary contingency actions within the period prescribed by the Corps and Ecology in the notification of approval of the contingency plan, the Corps and/or Ecology, with the concurrence of NMFS when fish conservation credits are involved, and in consultation with the Sponsor and the other members of the IRT, will direct remedial, corrective, and/or sanctioning action in accordance with the procedures specified in Appendix F, Section 4.0.

I. Force Majeure: The Sponsor may request pursuant to Article III.B., and the Corps and Ecology may approve, changes to the construction, operation, objectives, performance standards, timelines, or credit generation and award schedule of the Bank, pursuant to the standards and procedures specified in Appendix F, if all of the following occur: an act or event causes substantial damage such that it is determined to be a result of force majeure; such act or event has a significant adverse impact on the quality of the aquatic functions, native vegetation, or soils of the Bank site; and such act or event was beyond the reasonable control of the Sponsor, its agents, contractors, or consultants to prevent or mitigate.

1. The evaluation of the damage caused by force majeure and the resulting changes to mitigation requirements involve a communicative process. If the Sponsor asserts a mitigation site has sustained significant adverse impacts due to an event or act which may be determined to

be force majeure, the Sponsor shall give written notice to the Corps, Ecology, and the IRT as soon as is reasonably practicable. After receiving written notice, the Corps and Ecology, with the concurrence of NMFS when fish conservation credits are involved, and in consultation with the Sponsor and the other members of the IRT, shall evaluate whether the event qualifies as force majeure. The Corps and Ecology, with the concurrence of NMFS when fish conservation credits are involved, and in consultation with the Sponsor and the other members of the IRT, will then evaluate whether significant adverse impacts have occurred to the site. If a force majeure event is determined to have occurred and significant adverse impacts are found to have occurred to the site, the Corps and Ecology, with the concurrence of NMFS when fish conservation credits are involved, and in consultation with the other members of the IRT and the Sponsor, will evaluate whether and to what extent changes to the Bank site will be in the best interest of the site and the aquatic environment, and may approve such changes as detailed above. The Corps and Ecology retain sole discretion over the final determination of whether an act or event constitutes force majeure, whether significant adverse impacts to the Bank site have occurred, and to what extent changes to the Bank site or its management will be permitted.

- 2. Force majeure events include natural or human-caused catastrophic events or deliberate and unlawful acts by third parties.
- a. Examples of a natural catastrophic event include, but are not limited to: a flood equal to or greater in magnitude than the 100-year flood event; an earthquake of a force projected from an earthquake with a return period of 475 years; drought that is significantly longer than the periodic multi-year drought cycles that are typical of weather patterns in the Pacific Northwest; as well as events of the following type when they reach a substantially damaging nature: disease, wildfire, depredation, regional pest infestation, or significant fluviogeomorphic change.
- b. Examples of a human-caused catastrophic event include, but are not limited to, substantial damage resulting from the following: war, insurrection, riot, or other civil disorders, spill of a hazardous or toxic substance, or fire.
- c. Examples of a deliberate and unlawful act include, but are not limited to, substantial damage resulting from the following: the dumping of a hazardous or toxic substance, as well as significant acts of vandalism or arson.
- 3. The consequences of any events of force majeure recognized as such by the Corps and Ecology shall not affect the status of previously released Bank credits, whether or not they have yet been sold, used, or transferred; provided, however, that where fish credits for ESA-listed species habitat are involved, reinitiation of consultation may be required to determine the status of previously released Bank credits.
- **J.** <u>Default:</u> Should the Corps and/or Ecology, in consultation with the IRT, determine that the Sponsor is in material default of any provision of this Instrument, the Corps and/or Ecology may cease award of Bank credits, and may notify the Sponsor that the award, sale, and/or transfer of Bank credits, or use by the Sponsor of Bank credits as compensatory mitigation for its own activities causing adverse impacts to the aquatic environment, are suspended until the delineated

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deficiencies are rectified. Upon written notification of suspension, the Sponsor agrees to immediately cease any sale or transfer transactions not yet finally completed, and/or to cease any use by the Sponsor of Bank credits as compensatory mitigation for its own activities causing adverse impacts to the aquatic environment where a Corps or Ecology permit or authorization, as required, has not yet been issued, until informed by the notifying agency that award, sale, use, or transfer of Bank credits may be resumed. Should the Sponsor remain in default for a period of 90 days, the Corps and Ecology, with the concurrence of NMFS and in consultation with the other members of the IRT, may terminate this Instrument and any subsequent banking operations. In the event such termination action is commenced, the Sponsor agrees to fulfill its pre-existing obligations to perform all establishment, monitoring, maintenance, management, and remediation responsibilities that arise directly from Bank credits that have already been awarded, sold, used, or transferred at the time of termination. In the event of termination, no further sale or transfer of Bank credits may occur, nor any use by the Sponsor of Bank credits as compensatory mitigation for its own activities causing adverse impacts to the aquatic environment within the Service Area where a Corps or Ecology permit or authorization, as required, has not yet been issued.

K. Establishment Period of the Bank: The establishment period of the Bank will commence on the date the Instrument takes effect pursuant to Article VI.B.1. Prior to termination of the establishment period of the Bank, the Corps, and Ecology, in consultation with the IRT, will perform a final compliance inspection to evaluate whether all performance standards have been achieved. The establishment period for the Bank will terminate, and the period of long-term management and maintenance will commence, when the Corps and Ecology determine, with the concurrence of NMFS and in consultation with the other members of the IRT and the Sponsor, that the following conditions have been met:

(1) all applicable performance standards prescribed in Appendix C have been achieved;

(2) all available Bank credits have been awarded, or the Corps and Ecology, in consultation with the IRT, have approved the Sponsor's written request to permanently cease banking activities;

(3) the Sponsor has prepared a Long-Term Management and Maintenance Plan that has been approved by the Corps and Ecology through execution of a Long-Term Management and Maintenance Agreement, pursuant to Article IV.M.1 and Appendix G, Section 2.0;

(4) the Sponsor has either: (i) assumed responsibilities for accomplishing the Long-Term Management and Maintenance Plan, in which case the Sponsor will fulfill the role of Long-Term Steward, or (ii) assigned those responsibilities to another Long-Term Steward pursuant to Article IV.M.2. of this Instrument;

(5) the Bank has complied with the terms of this Instrument.

L. Operational Life of the Bank: The operational life of the Bank will commence on the date the Instrument takes effect pursuant to Article VI.B.1. Following the termination of the establishment period of the Bank, and (1) upon sale, transfer, or use by the Sponsor as compensatory mitigation for its own activities causing adverse impacts to the aquatic environment,

of all Bank credits, or (2) upon approval by the Corps and Ecology, in consultation with the IRT, of the Sponsor's written request to permanently cease banking activities, the operational life of the Bank will terminate.

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M. Long-Term Management and Maintenance:

1. The Sponsor shall develop a Long-Term Management and Maintenance Plan consistent with the guidelines and objectives specified in Appendix G, Section 2.0, and submit the Long-Term Management and Maintenance Plan for approval by the Corps and Ecology, with the concurrence of NMFS and in consultation with the other members of the IRT. The Sponsor is responsible, as Long-Term Steward, for execution of the approved Long-Term Management and Maintenance Plan. The Long-Term Steward will enter into a Long-Term Management and Maintenance Agreement with the Corps and Ecology, which will document the commitment on the part of the Long-Term Steward to adhere to the Long-Term Management and Maintenance Plan as well as memorialize the approval of the Long-Term Management and Maintenance Plan by the Corps and Ecology. The Long-Term Steward may only deviate from the approved Long-Term Management and Maintenance Agreement upon written approval by the Corps and Ecology, acting with the concurrence of NMFS when fish conservation credits are involved, and following consultation with the Long-Term Steward and the other members of the IRT.

2. The Sponsor may assign its long-term management and maintenance responsibilities to a third party assignee, which will then serve as Long-Term Steward in place of the Sponsor. The identity of the assignee and the terms of the long-term management and maintenance assignment agreement between the Sponsor and the assignee must be approved by the Corps and Ecology, with the concurrence of NMFS and in consultation with the other members of the IRT, in advance of long-term management and maintenance assignment.

3. Upon execution of a long-term management and maintenance assignment agreement and upon satisfaction of the remaining requirements for termination of the establishment period of the Bank under Article IV.K. of this Instrument, the Sponsor shall be relieved of all further long-term management and maintenance responsibilities under this Instrument.

N. Accomplishment of Sponsor Responsibilities; Transfer of Ownership of the Bank Site: The Sponsor shall remain responsible for complying with the provisions of this Instrument throughout the operational life of the Bank, regardless of the ownership status of the underlying real property, unless those responsibilities have been assigned pursuant to the provisions of Article VI.C. of this Instrument. The Sponsor shall provide written notice at least 60 days in advance of any transfer of ownership of all or a portion of the Bank real property or rights to another party, by any owners of real property comprising the Bank site, or their successors or assigns.

V. RESPONSIBILITIES OF THE CORPS AND ECOLOGY

A. The Corps and Ecology agree to provide appropriate oversight in carrying out provisions of this Instrument.

- **B.** The Corps and Ecology agree to review and provide comments on project plans, monitoring reports, contingency and remediation proposals, and similar submittals from the Sponsor in a timely manner. The Corps and Ecology will coordinate their review with the IRT.
- **C.** The Corps and Ecology agree to review requests to modify the terms of this Instrument, determine achievement of performance standards in order to evaluate the award of Bank credits, or approve the Long-Term Management and Maintenance Plan. The Corps and Ecology will coordinate the review with the IRT so that a decision is rendered, or comments detailing deficiencies are provided, in a timely manner. The Corps and Ecology agree to not unreasonably withhold or delay decisions on such requests.
- **D.** The Corps and Ecology agree to act in good faith when rendering decisions about requiring corrective or remedial actions, requiring long-term management and maintenance actions, and awarding Bank credits. Corps and Ecology approval of the identity of any assignee responsible for executing the LTMM Plan, and approval of the terms of any long-term management and maintenance assignment agreement, will not be unreasonably withheld.
- **E.** The Corps and Ecology will periodically inspect the Bank site as necessary, in consultation with the IRT, to evaluate the achievement of performance standards, to assess the results of any corrective measures taken, to monitor implementation of the LTMM Plan, and, in general, to verify the Sponsor's compliance with the provisions of this Instrument.
- **F.** Upon satisfaction of the requirements of Article IV.K. under this Instrument, the Corps and Ecology will jointly issue a letter certifying that the establishment period of the Bank has terminated, and that the period of long-term management and maintenance has begun, in consultation with the IRT. Upon satisfaction of the requirements of Article IV.L. of this Instrument, the Corps and Ecology will jointly issue a letter certifying that the operational life of the Bank has terminated.

VI. GENERAL PROVISIONS

A. <u>Decision Making by Consensus</u>: The Corps and Ecology will strive to achieve consensus among the IRT regarding issues that arise pertaining to the establishment, operation, maintenance, and management of the Bank. The Corps and Ecology will coordinate the review and oversight activities of the IRT to best facilitate opportunity to reach the desired consensus. Review and oversight decisions will take into account the views of the Sponsor to the maximum extent practicable. Where consensus cannot otherwise be reached within a reasonable timeframe, after seeking concurrence of NMFS as described herein and following full consideration of the comments of the IRT and following consultation with the Sponsor, the Corps holds the responsibility and authority under Section 404 of the Clean Water Act, and Ecology holds independent responsibility and authority under Section 401 of the Clean Water Act and ch. 90.48 RCW, to make final decisions regarding the application of the terms of this Instrument.

1. This Instrument, consisting of both this Basic Agreement and the Appendices, will enter into effect upon the signature by authorized representatives of each of Corps, Ecology, NMFS, Pierce County fulfilling its role as the "local jurisdiction" pursuant to RCW 90.84.040, and the Sponsor, as of the date of the last of these signatures.

2. This Basic Agreement portion of the Instrument may be amended or modified only with the written approval of the Sponsor, the Program Manager for Shorelands and Environmental Assistance on behalf of Ecology, the West Coast Region Regional Administrator on behalf of NMFS, and the Seattle District Engineer on behalf of the Corps, or their designees. Any such modifications or amendments will take effect following consultation with the IRT. Amendment or modification of the provisions of the Appendices may be effectuated through an exchange of letters signed by the Sponsor, the Mitigation Program Coordinator serving as Co-Chair on behalf of the Corps, and the Wetland Section Manager serving as Co-Chair on behalf of Ecology, acting with the concurrence of NMFS when fish conservation credits are involved, and following consultation with the other members of the IRT, provided the exchange of letters expresses mutual agreement as to the exact language to be deleted or modified, and the exact language to be inserted.

3. This Instrument may be terminated by the mutual agreement of the Sponsor, Corps, Ecology and NMFS, following consultation with the IRT, or may be terminated under the terms of Article IV.J. of this Instrument in the case of default by the Sponsor. In the event any termination action is commenced, the Sponsor agrees to fulfill its pre-existing obligations to perform all establishment, monitoring, maintenance, management, and remediation responsibilities that arise directly from Bank credits that have already been sold, used, or transferred at the time of termination.

4. Upon termination of the operational life of the Bank pursuant to Article IV.L., and certification to that effect pursuant to Article V.F., this Instrument shall terminate without further action by any Party. Thereafter, the Long-Term Management and Maintenance Agreement developed, approved, and instituted in accordance with Article IV.M. shall govern the continuing obligations of the Sponsor, or its assignee as applicable.

C. Assignment of Obligations under this Instrument: The Sponsor may be permitted to assign its obligations, responsibilities, and entitlements under this Instrument to a third party. The Corps, Ecology and NMFS, following consultation with the IRT, must approve the identity of the assignee in order for any assignment to effectively relieve the Sponsor of those obligations. In evaluating a prospective assignee, the Corps, Ecology, and NMFS may consider characteristics such as environmental mitigation expertise, wetlands mitigation project or analogous experience, expertise in salmon and salmonid habitat ecology, and financial strength and stability. Approval of the identity of the assignee will not be unreasonably withheld. The assignee must execute a mitigation banking instrument with the Corps, Ecology and NMFS under terms identical, to the extent practicable, to the present Instrument. In the event of such assignment, applicable financial assurances must be initiated. The obligations, responsibilities, and entitlements under this

Instrument may reside in only a single entity at any one time, and may not be severed or transferred piecemeal. However, the physical ownership of the Bank site real property and the obligations, responsibilities, and entitlements under this Instrument are separate and distinct; thus, ownership may be transferred pursuant to the provisions of Article IV.N., independently of assignment of this Instrument. Once assignment of this Instrument has been properly accomplished, the Sponsor will be relieved of all its obligations and responsibilities under this Instrument. Specific additional provisions pertaining to the assignment of long-term management and maintenance obligations are described at Article IV.M.

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D. Specific Language of this Basic Agreement Shall Be Controlling: To the extent that specific provisions of this Basic Agreement portion of the Instrument are inconsistent with any terms and conditions contained in the Appendices, or inconsistent with other documents that are incorporated into this Instrument by reference and that are not legally binding, the specific language within this Basic Agreement shall be controlling.

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E. Notice: Any notice required or permitted hereunder shall be deemed to have been given either (i) when delivered by hand, or (ii) three (3) days following the date deposited in the United States mail, postage prepaid, by registered or certified mail, return receipt requested, or (iii) when sent by Federal Express or similar next-day nationwide delivery system, addressed as follows (or addressed in such other manner as the party being notified shall have requested by written notice to the other party):

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Port of Tacoma

Director, Environmental and Planning Services P.O. Box 1837 Tacoma, WA 98401-1837 253-383-5841

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U.S. Army Corps of Engineers, Seattle District

Mitigation Banking Coordinator/Co-Chair of the IRT

Regulatory Branch

Seattle District, Corps of Engineers

4735 E. Marginal Way South

P.O. Box 3755

Seattle, WA 98124-3755

206-764-3708

363738

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Washington State Department of Ecology

Mitigation Banking Specialist/Co-Chair of the IRT

Shorelands and Environmental Assistance Program

P.O. Box 47600

300 Desmond Drive

43 Olympia, WA 98504-7600

44 360-407-6000

National Marine Fisheries Service, West Coast Region Washington Coast Lower Columbia River Branch Chief, 510 Desmond Drive, Suite 102 Lacey, WA 98503 360-534-9342

F. Entire Agreement: This Instrument, consisting of both this Basic Agreement and the Appendices, constitutes the entire agreement between the Parties concerning the subject matter hereof.

 G. <u>Invalid Provisions</u>: In the event any one or more of the provisions contained in this Instrument are held to be invalid, illegal or unenforceable in any respect, such invalidity, illegality or unenforceability will not affect any other provisions hereof, and this Instrument shall be construed as if such invalid, illegal or unenforceable provision had not been contained herein.

H. Effect of Agreement:

1. This Instrument does not in any manner affect statutory authorities and responsibilities of the signatory Parties. This Instrument is not intended, nor may it be relied upon, to create any rights in third parties enforceable in litigation with the United States or the State of Washington. This Instrument does not authorize, nor shall it be construed to permit, the establishment of any lien, encumbrance, or other claim with respect to the Bank site, with the sole exception of the right on the part of the Corps and Ecology to require the Sponsor to implement the provisions of this Instrument, including recording the conservation easement, required as a condition of approval of the crediting plan reflected in this Instrument and the issuance of any permits for discharges of dredged and fill material into waters of the United States associated with construction, operation and maintenance of the Bank.

2. Corps approval of this Instrument constitutes the regulatory approval required for Upper Clear Creek Mitigation Bank to be used to provide compensatory mitigation for Department of the Army permits pursuant to 33 C.F.R. 332.8(a)(1). This Instrument is not a contract between the Sponsor or property owner and the Corps or any other agency of the Federal government. Any dispute arising under this Instrument will not give rise to any claim by the Sponsor or property owner for monetary damages. This provision is controlling notwithstanding any other provision or statement in the Instrument to the contrary.

I. Attorneys' Fees: If any action at law or equity, including any action for declaratory relief, is brought to enforce or interpret the provisions of this Instrument, each party to the litigation shall bear its own attorneys' fees and costs of litigation.

J. <u>Availability of Funds</u>: Implementation of this Instrument is subject to the requirements of the Anti-Deficiency Act, 32 U.S.C. § 1341, and the availability of appropriated funds. Nothing in this Instrument may be construed to require the obligation, appropriation, or expenditure of any money from the United States Treasury, in advance of an appropriation for that purpose.

- **L.** <u>Counterparts</u>: This Instrument may be executed by the Parties in any combination, in one or more counterparts, all of which together shall constitute one and the same instrument.

M. <u>Binding</u>: This Instrument, consisting of both this Basic Agreement and the Appendices, shall be immediately, automatically, and irrevocably binding upon the Sponsor and its heirs, successors, assigns and legal representatives upon execution by the Corps, Ecology, NMFS, Pierce County fulfilling its role as the "local jurisdiction" pursuant to RCW 90.84.040, and the Sponsor.

PARTIES:	
By the Sponsor:	
Eric Johnson	Date
Executive Director	
Port of Tacoma	
By the Corps:	
Mark A. Geraldi	Date
Colonel, Corps of Engineers	Date
Seattle District Engineer	
Ç	
By Ecology:	
Gordon White	Date
Program Manager, Shorelands and Environment	
Washington State Department of Ecology	C
By NMFS:	
Barry Thom	Date
Barry Thom Regional Administrator, West Coast Region	Date
	Date
Regional Administrator, West Coast Region	Date
Regional Administrator, West Coast Region	Date

1	OTHER IRT MEMBERS:	
2 3	Sign of the har than IDT manifests in disaster account on the next of the	
	Signature by other IRT members indicates assent on the part of the	
4 5	provisions of this Instrument, but does not give rise to any affir	
	implied. This Instrument is not binding on the other IRT members).
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10	Daniel D. Opalski	Date
1	Director, Water Division	2 333
2	U.S. Environmental Protection Agency, Region 10	
3		
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16		
7	Scott R. Sissons	Date
8	Environmental Biologist 3, Resource Management Section	
9	Pierce County Planning and Public Works	
20		
1		
22		
23	 	
24	Margen Carlson	Date
25	Habitat Program Director	
6	Washington Department of Fish and Wildlife	
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UPPER CLEAR CREEK MITIGATION BANK

Appendices to the Mitigation Banking Instrument

Port of Tacoma
One Sitcum Plaza
Tacoma, WA 98421

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APPENDIX A General Banking Information

Appendix A. General Bank Information

A1.0 BUSINESS PURPOSE AND ECOLOGICAL GOALS OF THE UPPER CLEAR CREEK BANK

The purpose of the Port of Tacoma's (Port's) Aquatic Resource Mitigation and Fish Conservation Bank is to generate universal and fish conservation credits for future projects for the Port's own use as well as to sell credits to others. The credits generated by the Bank will be used to compensate for projects that will have an adverse impact on the aquatic environment and/or to federally listed species, and that need to compensate for those impacts as a condition of their permits or other regulatory requirements resulting from those impacts.

The primary ecological goals of the Bank are as follows:

- Realign Clear Creek into a meandering channel through the floodplain wetlands to restore floodplain connectivity and rehabilitate riverine wetlands and off-channel Palustrine Aquatic Bed (PAB) ponds,
- Remove historic man-made disturbances including the side-cast berm levee along Clear Creek, a drainage ditch, and three drain tiles,
- Re-establish, rehabilitate, and enhance wetland and upland habitat to pre-impact conditions,
- Establish diverse hydrogeomorphic conditions and vegetation zones, including emergent, scrub-shrub, and forested wetlands,
- Maximize wetland area and functions,
- Establish multiple native wetland plant communities and functional native vegetated buffers,
- Restore fish and wildlife habitat, structure, and function of the site, and
- Manage invasive and non-native species at the site.

Relevant documentation supporting the technical information in these appendices is included in a separate Resource Folder. The Resource Folder is not considered part of the MBI but is prepared by the Sponsor and provided to all IRT members to serve as a reference document. The Resource Folder for the Bank includes the wetland delineation report, wetland functional assessment, vegetation survey, hydrologic monitoring and modeling reports, basis of design report, and other technical information that was used to establish baseline conditions at the Bank and support the design of the site.

A1.1 Overview of the Upper Clear Creek Mitigation Site (UCCMS)

The overall 41.35-acre Upper Clear Creek Mitigation Site (UCCMS) includes two component sites: the Port of Tacoma Upper Clear Creek Mitigation Bank (28.64 acres) (Bank site) and the 12.59-acre mitigation site restored to comply with a Federal Consent Decree with the Environmental Protection Agency (EPA) (EPA site) (see, United States v. Port of Tacoma, et al., No. 11-cv-05253 [W.D. Wa.]). The EPA site is located directly adjacent to the north of the Bank. Both sites have been built. The Bank site was built in conjunction with the EPA site to take advantage of the design and construction efficiencies afforded by having already designed and staged the EPA site and to accommodate the timeline demanded by the Consent Decree (Figures A1 and A2). The Port of Tacoma Critical Area Development Plan (No. CAP2013-40000209075)

submitted with its Joint Aquatic Resources Permit Application (JARPA), and the Consent Decree both show the distinct purpose of the two sites and demonstrate that the Bank Site was constructed on the basis that it would be used to generate mitigation credits for future development projects (Port of Tacoma, 2014, and United States v. Port of Tacoma, 2013). NMFS and Port of Tacoma had discussed banking options for the Bank Site while Port of Tacoma worked with EPA to develop the Consent Decree and the mitigation site it covers. The Port of Tacoma took advantage of practical efficiencies to construct the entire UCCMS at the same time between 2014 and 2016. Thereafter, the Bank site went through the IRT process for approval and establishment. These appendices support the IRT approval and establishment process.

Elements of the EPA site are discussed in the Instrument to document the synergy between the two areas and describe how restoration activities at each site contribute to functional lift across both sites. Essentially, the two sites are part of one overall restoration project. However, universal and fish conservation mitigation credits will only be generated from the Bank portion of the overall UCCMS Project (Figure A2).

A1.1.1 Bank Site

The Bank encompasses 28.64 acres of the overall 41.23-acre UCCMS. Baseline conditions include 11.49 acres of degraded emergent wetland, 10.52 acres of degraded forested wetland and 0.04 acres of degraded scrub-shrub wetland habitats, all of which are disconnected from Clear Creek during most flows by a manmade side-cast berm levee. The Bank also includes 0.80 acres of Clear Creek and includes 5.79 acres of degraded uplands. Table A1 provides the acreages of the existing plant communities found at the Bank.

TABLE A1. EXISTING PLANT COMMUNITIES

Existing Plant Community	Total Acres
UPL Herbaceous / Developed	5.79
PEM Invasive	11.49
PSS	0.04
PFO	10.52
Clear Creek	0.80
TOTALS:	28.64

A1.1.2 EPA Site

The EPA site consists of 12.59 acres in the northern portion of the UCCMS and includes 5.25 acres of degraded emergent wetland and 0.47 acres of degraded forested and scrub shrub wetland.

A2.0 BANK LOCATION AND LEGAL DESCRIPTION

The Bank is located in unincorporated Pierce County on the southwest side of the Puyallup River valley along Clear Creek, approximately 0.7 river miles (RM) upstream of the confluence with the lower Puyallup River (Figure A1). The Bank includes a portion of Clear Creek and adjacent floodplain habitat east of the stream that is also within the floodplain of the Puyallup River.

The Bank is owned by the Port, and consists of parcels 0320141001 and 0320141086 with respective street addresses of 3714 Gay Road East and 4014 Gay Road East, Tacoma, Washington (Exhibit A1). The legal description of the overall UCCMS, which includes the Bank, is provided in Exhibit A1 at the end of this appendix. The Bank lies southwest of the intersection of Gratzer Road East and River Road East (State Route [SR] 167) within Sections 13 and 14 of Township 20 North, Range 3 East, Willamette Meridian. The Bank is located within Water Resource Inventory Area (WRIA) 10.

All real property to be included within the Bank is owned in fee simple by the Port of Tacoma, and has been pledged for use in the Bank in a manner consistent with this Instrument. The inclusion of the aforementioned property in the Bank and the granting of a conservation easement restricting future land uses for the benefit of the Bank shall not convey or establish any property interest on the part of any Party to this Instrument, nor convey or establish any interest in Bank credits. The Instrument does not authorize, nor shall it be construed to permit, the establishment of any lien, encumbrance, or other claim with respect to the property, with the sole exception of the right on the part of the US Army Corps of Engineers (Corps) and Washington State Department of Ecology (Ecology) to require the Sponsor to implement elements of this Instrument, including recording the conservation easement, in exchange for Corps and Ecology approval of this Instrument and the program of development and use of mitigation credits delineated herein.

A3.0 SITE DESCRIPTION AND BASELINE CONDITIONS

A3.1 Site Description

The Bank is one part of a two-part combined habitat improvement site (EPA site and the Bank site) referred to as the overall Upper Clear Creek Mitigation Site (UCCMS). The overall UCCMS is a habitat improvement project on approximately 41 acres of land in the Clear Creek drainage, located between the cities of Puyallup and Tacoma on the southwest side of the Puyallup River valley. The overall UCCMS consists of a 12.59-acre EPA site (in support of a Consent Decree in United States v. Port of Tacoma, et al., No. 11-cv-05253 [W.D. Wa.]) and a 28.64-acre mitigation Bank site. This Instrument only pertains to the 28.64-acre mitigation Bank portion of the UCCMS and not to the 12.59-acre EPA site. However, several components of the EPA site are discussed in the Instrument to provide context for Bank restoration.

The Bank contains Clear Creek, approximately 0.7 RM upstream of the creek's confluence with the lower Puyallup River. All wetlands at the site, including the existing forested wetland, are degraded due to historic farming and drainage activities. Clear Creek was historically rerouted along the western property boundary adjacent to the Drainage District 10 (DD10) parcel, and it comprises approximately 0.80 acres of the Bank. Clear Creek was channelized and an upland side-cast berm levee was constructed on the right bank. The side-cast berm levee consists of approximately 1.6 acres of degraded herbaceous uplands. A total of 27.77 acres (22.05 acres in Bank and 5.72 acres in EPA site) of the overall UCCMS contain existing degraded wetlands including; 16.74 acres (11.49 acres in Bank and 5.25 acres in EPA site) of degraded emergent wetland, 10.99 acres (10.52 acres in Bank and 0.47 acres in EPA site) of degraded forested wetland and 0.04 acres in the Bank of degraded scrub-shrub wetland that are not properly functioning due to the presence of the side-cast berm levee.

Although portions of the wetland contain native, forested wetland vegetation (PFO), the wetland is still highly degraded due to the historic actions that took place on the site. These actions include the creek

modifications and side-cast berm levee construction described above. These historic actions prevent the establishment of properly functioning riparian habitat and limit interactions between the creek and the forested floodplain wetland. Flood waters overtop the side-cast berm levee during high flow events, but the berm decreases the creek's interaction with the floodplain wetland and prevents return flows from draining back into the channel; with the exception of a dual culvert through the levee in one location (Figures A2 and A4). This results in desynchronization of flood flows between Clear Creek and the surrounding riparian wetlands at the Bank, alters sediment deposition patterns, and causes fish stranding.

Uplands at the overall UCCMS are also heavily degraded by historic agricultural uses. 12.66 acres (5.79 acres in Bank and 6.87 acres in EPA site) consist of degraded, upland field, lawn and agricultural/residential structures (including an underground storage tank) that abut an emergent wetland on the northeast portion of the overall UCCMS. Table A2 contains the existing habitat types and acreages (Figure A3).

TABLE A2. OVERALL UCCMS EXISTING ACREAGES

Habitat Type	Bank site (acres)	EPA site (acres)	Overall UCCMS Total (acres)
UPL Herbaceous/Developed	5.79	6.87	12.66
PEM	11.49	5.25	16.74
PSS	0.04	0.0	0.04
PFO	10.52	0.47	10.99
Clear Creek	0.80	0.0	0.80
Overall Total:	28.64	12.59	41.23

Surrounding offsite land use conditions include Gay Road East and the EPA site to the north, rural residential development to the north and northeast, Burlington Northern Santa Fe (BNSF) railroad tracks and the Drainage District 10 (DD10) parcel to the west, and forested wetlands to the south and southeast.

A3.1.1 Zoning

The Bank and several parcels in the project vicinity are zoned as Agricultural Resource Lands while the remaining surrounding lands are zoned Rural Separator. Agricultural Resource Lands allow for agricultural uses and Rural Separator allows for up to two residences per five acres.

A3.1.2 Floodway

The Bank and surrounding vicinity are also designated as floodway (Figure A5), which Pierce County defines as areas of a floodplain at greatest risk to life and property. The primary activities allowed in the floodway include agriculture, parks, and habitat enhancement (Pierce County 2015). Although agricultural activities are allowed in the floodway, the addition of new structures and accessory buildings needed for high intensity commercial agriculture would not be allowed.

Additionally, Pierce County has developed a floodway buyback program to purchase property within the Clear Creek/Puyallup River floodway from willing landowners to relieve flooding over approximately 400 acres, which includes the area surrounding the Bank. The county plan includes the purchase of

properties, the removal of structures, and the creation of a ring levee for flood storage. Pierce County expects this project to take at least 10 years to complete, dependent on the willingness of landowners to sell and the availability of grant funds (Pierce County 2016a).

A3.1.3 Pierce County Habitat Conservation Plan

Pierce County is developing a Habitat Conservation Plan (HCP) to mitigate for the County's flood risk reduction maintenance and operations activities (Pierce County 2016b). The HCP is planned to be completed in 2019 according to Pierce County's website. The primary goal of the County's HCP is to protect and restore habitats for federally listed species that may be affected by Pierce County Department of Surface Water Management's flood risk reduction activities. Clear Creek and the Bank were initially within one of the four mitigation project areas identified in the development of the draft HCP. However, in the Fall of 2017, Pierce County removed the Clear Creek area (including the Bank) from the draft HCP which is still under development with NMFS and the USFWS. Specific objectives of the plan include improving habitat for federally listed species by:

- Acquiring floodplain parcels, demolishing structures, and removing unneeded levees, and
- Constructing setback levees and restoration projects that provide floodplain connectivity, activate side channels or provide other important habitat features.

Additional information about Pierce County's HCP is contained in section 5.0 (Watershed Restoration Needs Met by the Bank) of this appendix.

A3.1.4 Surrounding Land Uses and Conditions

Properties surrounding the Bank are all zoned Rural Separator except for the EPA site to the north and a parcel to the southeast, which are both zoned Agricultural Resource Land. The entire area surrounding the Bank is designated floodway.

Land conditions surrounding the bank include the following:

- EPA site and rural residential properties or Gay Road to the north,
- Rural residential structures, mowed uplands, mowed wetlands, and forested wetlands to the east,
- A Forested Category II wetland to the south, and
- An undeveloped 40-foot-wide DD10 parcel to the west (located on the left bank of Clear Creek) that is sloped towards Clear Creek and consists of groundcover, shrubs, and trees.

A3.2 Baseline Condition

Historical land uses in the Clear Creek basin have primarily included agriculture and low-density residential uses. The lower Puyallup River floodplain, which includes the lower Clear Creek basin, attracted farmers with its nutrient rich soils and flat uniform land ideal for farming. As a result, Clear Creek and several other streams in the Puyallup River valley were diverted from their original locations in the early 20th century to provide additional agriculture acreage. Clear Creek was diverted into a straight, excavated ditch along the western boundary of the Bank.

The Bank property was historically used for pasture, hay production, and other agricultural purposes (Figures A8 through A11). The property experienced typical agriculture impacts including annual plowing or tilling, soil compaction, water diversion or drainage, wetland fill and alteration and removal of, or disturbance to, shrub and forested vegetation.

Baseline conditions of the Bank are assessed and characterized in the following reports of the pre-compensatory mitigation site conditions:

- Clear Creek and wetlands on the overall UCCMS were delineated by Grette Associates. The Upper Clear Creek Mitigation Site Revised Wetland Delineation and Analysis report presents the results of the delineation including site characteristics, historic information, habitat conditions, methods, vegetation, hydrology, hydric soils, stream typing, wetland categorization, buffers, and functions (Grette 2012).
- Information on fish and wildlife species and habitat conservation areas regulated by Pierce County is presented in the *Habitat Assessment—Upper Clear Creek Mitigation Site* (Herrera 2013b).
- Information on threatened and endangered species, critical habitat, and essential fish habitat is presented in the *Biological Evaluation—Upper Clear Creek Mitigation Site* (Herrera 2013c).
- Information on overall UCCMS water depths and flow velocities based on computer modeling for baseline and designed conditions is presented in the *Hydrologic and Hydraulic Analysis Upper Clear Creek Habitat Site* (Herrera 2012).
- Information on groundwater and Clear Creek stage monitoring is presented in the *Hydrologic Monitoring Report—Upper Clear Creek Mitigation Site* (Herrera 2013a).
- Information on subsurface soil conditions is presented in the Subsurface Exploration Data Report Upper Clear Creek Habitat Restoration (Aspect 2012).
- Information on cultural resources is presented in the *Preliminary Cultural Resources Assessment of the Upper Clear Creek Mitigation Property Habitat Restoration* report (NWAA/SWCA 2012) and the *Results of Archaeological Monitoring at the Upper Clear Creek Mitigation Site* report (SWCA 2015).

These reports are provided in the Resource Folder. The following sections summarize key results of these reports pertaining to aquatic resources and fish habitat conservation on the Bank.

A3.2.1 Cultural Resources

A Cultural Resources Assessment was conducted by Northwest Archaeological Associates (NWAA)/SWCA Environmental Consultants (SWCA) for the UCCMS (NWAA/SWCA 2012). Archaeological monitoring was also conducted by SWCA during the geotechnical investigation and during construction of the habitat restoration project as documented in the Results of Archaeological Monitoring at the Upper Clear Creek Mitigation Site report (SWCA 2016).

A3.2.2 Geomorphology and Landscape Context

The Bank is located in the Puget Sound Lowlands, and historically morphed from a marine embayment, to a tidally influenced wetland, then finally to a proximal delta floodplain as a result of glaciation, isostatic rebound, and fluvial deposition from the Puyallup River. The site is located on the left bank floodplain of the Puyallup River very close to the transition between the distal and proximal part of the Puyallup River delta. The site is located 3,700 feet upstream from the confluence with the Puyallup River; however, the

site is supratidal with the tidal influence in Clear Creek extending upstream of the confluence with the Puyallup River to approximately 500 feet of the site.

Clear Creek was relocated from its original location in the early 20th century. Historic aerial photographs show the property shortly after diversion of the creek, from which its historic alignment through the property can be inferred. Based on reconnaissance site visits, it appears that while past agricultural uses on the property have removed the indicators of the historic channel location in many areas of the site, several remnant channels are present, particularly in the eastern and southern portions of the site.

The Clear Creek basin is characterized by three distinct topographic regions. The upper topographic region consists of headwaters located on a flat terrace with numerous small ponds, wetlands, and urbanized hydro-modifications such as storm drains and ditches. Future changes to basin hydrology attributable to urbanization within the Clear Creek basin are anticipated to be minimal. According to the Clear/Clarks Creek Basin Plan, future changes (assuming current zoning build out) to the effective impervious area (EIA) in the Clear Creek subbasin will change from 19 to 23 percent (Pierce County, 2006). The middle topographic region is characterized by a short and steep valley wall which contains incised channels that drain to the lower topographic region – the flatlands of the Puyallup River floodplain, where the Bank is located.

The upper terrace region contributes very little sediment to Clear Creek. The majority of sediment input to Clear Creek is from bank erosion in the steep middle topographic region. Canyon Creek transitions from a steep channel to a low gradient channel nearly 2 miles upstream of the Bank, so sediment input to the project area from Canyon Creek is significantly metered and limited. Sediment input from Clear Creek is also limited due to annual dredging activities at the Troutlodge fish hatchery (located approximately 0.4 miles upstream of the Bank at the confluence of Clear Creek and Canyon Creek), at the historic alluvial fan of Clear Creek as it transitions onto the Puyallup River floodplain. The majority of sediment input to the project site is likely to come from Squally Creek, which is the smallest of the Clear Creek subbasins, with a drainage area less than one square mile. A small alluvial fan is located on Squally Creek just upstream of the railroad tracks, which meters sediment input to the project area.

In general, sediment delivery to the site appears to be metered in two ways: 1) from the upstream alluvial fans at the valley edge, depositing sediment at the confluences of the upstream tributaries as they discharge into Clear Creek; and 2) sequestration of sediment forced by the constriction of the railway. As such, variable deposition will occur on the project site, but it is unlikely that deposition of large volumes of bed load sediment will occur. Finer sediments are likely to deposit on the periphery of the floodplain where shear stresses are low, but this type of sediment accretion will be variable and therefore, unrealistic to quantify.

A3.2.3 Soils

According to the Soil Survey of Pierce County, Washington (Zulauf 1979), the soils at the UCCMS are mapped as Sultan silt loam (42A), Snohomish silty clay loam (39A), and Puyallup fine sandy loam (31A) as shown on Figure A6 – Soil Survey Map. The Puyallup-Sultan association consists of nearly level, well drained and moderately drained soils that formed in alluvium and deposited in floodplains by the floodwaters of the White and Puyallup Rivers (Zulauf 1979). The Puyallup soils are well drained and consist of fine sandy loam; whereas Sultan soils are moderately well drained and are stratified silty clay loam, silt loam, fine sandy loam, and fine sand (Zulauf 1979).

According to the geotechnical survey conducted at the site, there are deposits of what appear to be imported soils throughout the site that range from 0.5 to 8.5 feet below the surface and typically consist of a brown to gray clayey silt. In addition, deposits of historic soils were identified throughout the site at depths ranging from 2.5 to 8.0 feet below the existing surface and typically consisted of a dark brown peat. The survey also identified a fine-grain sediment deposit typically associated with a low energy fluvial depositional environment. This layer consisted of gray silt with scattered interbeds of organic silt and fine sand that ranged from 2.5 to 15 feet below the existing grade.

As described in the *Upper Clear Creek Mitigation Site* – *Revised Wetland Delineation and Analysis Report* (Grette Associates 2012), the typical soil profiles observed within wetland areas on the site are 0-4 inches of 7.5YR 3/2 silt loam over a layer 4-16+ inches of 60-70% 10YR 4/1 silt loam with 30-40% 7.5YR 5/6 redox concentrations. Soil profiles within wetland areas met the F3 hydric soil indicator (depleted matrix) as described in *Field Indicators of Hydric Soils in the United States Version 6.0* (United States Department of Agriculture [USDA] and Natural Resources Conservation Service [NRCS], 2006).

A3.2.4 Hydrology

Clear Creek is a left bank tributary to the lower Puyallup River, entering the river at RM 2.6 and draining approximately 12 square miles within the City of Tacoma and the communities of Midland and Summit, in unincorporated Pierce County. Three main tributaries enter Clear Creek near the project site. Canyon Creek is a right bank tributary that enters Clear Creek approximately 2,000 feet upstream of the southern Bank boundary. Squally Creek is a left bank tributary that enters Clear Creek from beneath the railroad tracks approximately 1,000 feet upstream of the southern Bank boundary. Swan Creek is also a left bank tributary that enters Clear Creek approximately 3,500 feet downstream of the northern Bank boundary. Clear, Canyon, Squally, and Swan Creeks are all salmon bearing streams. In addition, a Troutlodge fish hatchery is present near the confluence of Canyon Creek with Clear Creek.

Wetland hydrology is primarily driven by seasonal high groundwater associated with water levels within Clear Creek. Overbank and over side-cast berm levee flooding from Clear Creek occurs in response to large rain events and contributes surface water to the site during winter months. The side-cast berm levee that was adjacent to Clear Creek decreases the creeks interaction with the floodplain wetland and prevents surface waters from draining back into the channel, with the exception of a dual culvert through the side-cast berm levee. The side-cast berm levee also acts as a fish passage barrier for fish return to Clear Creek when flood waters recede.

Hydrologic and hydraulic analyses were conducted for the Bank in 2012 using a steady-state hydraulic model of the site developed from US Army Corps of Engineers HEC-RAS software (Herrera 2012). Hydrologic monitoring was conducted for the site between 2011 and 2013 using eight groundwater monitoring wells, a stream stage gauge, and two staff gauges (Herrera 2013a). The hydraulic analysis conducted for the site (Herrera 2012) identified that the floodplain on the site is largely isolated from upstream inflow from Clear Creek; however, the site becomes flooded in the fall as a result of groundwater/surface ponding and/or over bank flooding from Clear Creek and remains flooded through the spring. Floodplain connectivity is primarily a result of downstream backwater from the Gay Road culvert. Additional information regarding hydrologic and hydraulic conditions at the Bank is contained in in the *Hydrologic and Hydraulic Analysis – Upper Clear Creek Habitat Site Report* (Herrera 2012) and the *Hydrologic Monitoring Report – Upper Clear Creek Mitigation Site* (Herrera 2013a) included in the Resource Folder.

The high groundwater table, generally flat site, absence of a meandering channel, and isolation by the side-cast berm levee all contributed to shallow surface water flooding across vast portions of the site from approximately mid-October through July. Smaller portions of the site in lower lying areas are flooded year round, which likely result in fish stranding.

The floodplain contains many flood stages based on Clear Creek flows and backwater inundation from the Puyallup River. Over 90 percent of the site is frequently inundated as part of the first flood stage of the floodplain given its low and flat nature. Most of the second tier flood stage is located offsite to the east and south. A third tier flood stage is located at the north end of the site along a higher terrace that is only inundated during extreme flood events associated with backwater from the Puyallup River, such as the 1996 and 2009 floods.

The primary baseline hydroperiod at the Bank is seasonally flooded or inundated. The remaining margins of the wetland are occasionally flooded or saturated only, as shown on Figure A4.

A3.2.5 Wetlands

Grette Associates (2012) conducted wetland delineations on the overall UCCMS in June 2011 and March 2012. One wetland was delineated (Wetland A), and the flagged boundary surveyed (Figure A3). The wetland covers approximately 22 acres of the Bank and extended offsite to the north, south and east, for a total area of approximately 43 acres.

On the Bank, Wetland A, a Category II wetland, consists of approximately 11.49 acres of degraded emergent wetland and 10.56 acres of degraded forested and scrub shrub wetland, according to the *Washington State Wetland Rating System for Western Washington, 2014 Update* (Hruby 2014). The Category II rating is primarily due to the large size of the overall wetland, which continues offsite into the EPA site and other adjacent properties to occupy approximately 43 acres total, and the multiple vegetation classes present within the overall wetland. The wetland is categorized as riverine hydrogeomorphic class, and is rated as riverine in accordance with the rating system. However, the wetland, including the existing forested wetland, does not function properly as a riverine wetland due to the presence of the side-cast berm levee that impedes most flood flows from natural interactions between Wetland A and Clear Creek. The United States Fish and Wildlife Service (USFWS) classifications of the wetland include seasonally flooded palustrine emergent (PEMC), palustrine scrub/shrub (PSSC), and palustrine forested (PFOC) vegetation communities (Cowardin et al. 1979), as shown on Figure A3.

TABLE A3. BASELINE FUNCTIONAL POINTS ON THE WETLAND RATING FORM

Function	Improving Water Quality	Hydrologic	Habitat
Site Potential	Moderate	High	Moderate
Landscape Potential	High	Moderate	Low
Value	High	High	High
Score Based on Ratings	8 8 6		6
Wetland Category	II (22 total points)		

Wetland A is rated as a Category II wetland due to its size and the presence of forested habitat features in several areas (Table A3). However, onsite riverine wetland hydrology and vegetation are highly degraded by

historic agricultural activities and the channelization of the historic creek into a linear ditched channel by DD10. The riverine wetland is separated from Clear Creek through relocation of the historic creek channel and creation of a side-cast berm levee. The side-cast berm levee impedes surface water connectivity between Wetland A and Clear Creek during low to moderate flood flows. During larger floods Clear Creek and wetland/floodplain become connected. However, as flood water recede, the side-cast berm levee traps return flows behind the side-cast berm levee, disconnecting Clear Creek from Wetland A and trapping fish. During smaller storm/flood flow events the wetland/floodplain remains disconnected from Clear Creek by the side-cast berm levee. See the Hydrologic and Hydraulic Analysis for more specific details. Historically, the wetland size was historically reduced by draining and filling portions of the wetland, and by removing native wetland vegetation from most of the onsite portion of the wetland to accommodate agricultural crops. When agricultural crops were abandoned at the site, invasive reed canarygrass colonized the majority of the site and was mowed periodically. Figures A8 through A11 show historic aerial imagery of the site in 1931, 1940, 1950 and 1973.

A3.2.6 Vegetation

Much of the northern portion of the Bank is dominated by emergent vegetation, including non-native species such as reed canarygrass and meadow foxtail. Native species observed within the wetland include field horsetail and slough sedge (*Carex obnupta*). Canadian thistle (*Cirsium arvense*) and common velvetgrass (*Holcus lanatus*) dominate the areas. Approximately two acres within the northern portion of the Bank are forested and dominated by Pacific willow (*Salix lasiandra* ssp. *lucida*) and red osier dogwood (*Cornus sericea*). In addition, a forested plant community is present along portions of the left bank of Clear Creek within and adjacent to the DD10 parcel. This riparian forest is dominated by big-leaf maple (*Acer macrophyllum*), red alder (*Alnus rubra*), and black cottonwood (*Populus balsamifera*) over a shrub understory dominated by salmonberry (*Rubus spectabilis*), Himalayan blackberry (*Rubus armeniacus*, and Indian plum (*Oemleria cerasiformis*).

The southern portion of the Bank contains forested wetland habitat (Existing PFO) primarily composed of deciduous black cottonwood canopy with hardhack (*Spirea douglasii*) understory. Other scrub-shrub and forest vegetation in the forested wetland areas include red alder, Pacific willow, and red-osier dogwood with areas of emergent skunk cabbage and reed canarygrass. Deciduous trees in the forested wetland areas provide a source of large woody material habitat features including downed logs and standing snags.

The remainder of the Bank is undeveloped land, predominantly fallow pasture. A list of plant species observed on or adjacent to the Bank is provided in Table A4 below.

TABLE A4. PLANT SPECIES IDENTIFIED ON OR ADJACENT TO THE BANK

Species Name ¹	Common Name	Indicator Status ¹	Wetland Areas	Upland Areas
Acer macrophyllum	big-leaf maple	FACU		X
Agrostis capillaris	colonial bent	FAC	X	X
Agrostis gigantea	black bent	FAC	X	X
Alnus rubra	red alder	FAC	X	
Alopecurus pratensis	field meadow foxtail	FAC	Χ	Χ
Athyrium cyclosorum	western lady fern	FAC	Χ	
Carex obnupta	slough sedge	OBL	X	X

TABLE A4. PLANT SPECIES IDENTIFIED ON OR ADJACENT TO THE BANK (CONTINUED)

Species Name 1	Common Name	Indicator	Wetland Areas	Upland Areas
Cirsium arvense	Canada thistle	FAC		Χ
Cirsium vulgare	bull thistle	FACU		Χ
Cornus alba	red-osier	FACW	Χ	
Corylus cornuta	beaked hazelnut	FACU		Χ
Crataegus monogyna	english hawthorn	FAC		Χ
Dactylis glomerata	orchard grass	FACU		Χ
Equisetum arvense	field horsetail	FAC	X	Χ
Galium aparine	Sticky-Willy	FACU		Χ
Holcus lanatus	common velvet grass	FAC	X	X
Hypochaeris radicata	hairy cat's ear	FACU	X	Χ
Juncus effusus	Lamp rush	FACW	X	Χ
Lysichiton americanus	Yellow-skunk-cabbage	OBL	X	
Oemleria cerasiformis	Oso-Berry	FACU		Χ
Phalaris arundinacaea	reed canary grass	FACW	X	Χ
Plantago lanceolata	English plantain	FACU		Χ
Plantago major	great plantain	FAC		Χ
Poa pratensis	Kentucky blue grass	FAC	X	Χ
Polygonum convolvulus	Bindweed	FACU		X
Polystichum munitum	pineland sword fern	FACU		Χ
Populus balsamifera	balsam poplar	FAC	X	Χ
Ranunculus repens	creeping buttercup	FAC	X	
Rubus armeniacus	Himalayan blackberry	FAC		Χ
Rubus spectabilis	Salmon rasberry	FAC	X	
Rubus ursinus	California Dewberry	FACU		Χ
Salix lasiandra	Pacific willow	FACW	X	
Sambucus racemosa var. pubens	red elder	FACU		X
Scirpus microcarpus	red-tinge bulrush	OBL	X	Х
Solanum dulcamara	climbing nightshade	FAC	Χ	
Spiraea douglasii	Douglas'	FACW	X	X
Taraxacum officinale	common dandelion	FACU		Х
Trifolium pratense	red clover	FACU		Χ
Trifolium repens	white clover	FAC		Χ
Urtica dioica	stinging nettle	FAC	Χ	
Vicia sativa	garden vetch	UPL		Х

Notes:

A3.2.7 Clear Creek and Riparian

Clear Creek fish habitat is degraded by historic alterations associated with agricultural activities on the site. Clear Creek is confined within a straight channel that runs along the toe of the hillside bordering the west side of the site. A side-cast berm levee historically constructed along the right bank of Clear Creek prevents

¹ Scientific names and wetland indicator status taken from The National Wetland Plant List, Western Mountains, Valleys, and Coast Region (Lichvar, R.W., et al., 2016).

the establishment of properly functioning riparian habitat and limits interactions between the creek and the floodplain (Wetland A). Flood waters overtop the side-cast berm levee during high flow events, but the berm decreases the creek's interaction with the floodplain wetland and prevents return flows from draining back into the channel, with the exception of a dual culvert through the side-cast berm levee in one location (Figures A2 and A4). This results in desynchronization of flood flows between Clear Creek and the surrounding riparian wetlands at the Bank, altered sediment deposition patterns, and fish stranding. During the initial phase of flooding, as water levels rise in Clear Creek, the side-cast berm levee impedes water from entering the floodplain wetland. When flood flows overtop the side-cast berm levee, water then rapidly enters the floodplain wetland. And as flood flows recede, the side-cast berm levee again impedes return flows into Clear Creek.

Clear Creek is classified as a Type F2 stream according to Pierce County Code (PCC) Chapter 18E.40.060 based on fish-bearing status and adjacency to a landslide hazard area. Channel complexity and structure is severely limited by the artificial channelization of the creek. Although the majority of Clear Creek is situated on Port property, the DD10 parcel is located adjacent to Clear Creek and contains a small portion of the creek at the northern and southern extents of the Bank.

Riparian areas along Clear Creek are degraded. Agricultural practices result in most of the large tree and shrub vegetation along the east side of the channel being removed or maintained to maintain flow through the creek and maintain the integrity of the side-cast berm levee. In addition, the functional riparian habitat along the creek is limited in width due to the presence of the railroad grade, the presence of the side-cast berm levee, and agricultural uses of the site. The narrow riparian corridor provides limited shading and minimal large woody material (LWM) recruitment.

Habitat complexity in Clear Creek is greatly degraded with little available side-channel, off-channel, or high-quality pool habitat. Fish habitat in Clear Creek consists of monotypic glide habitat characterized by a low-gradient (between 0 and 1 percent) channel with fine silt substrate, and occasional beds of sand. Wetted widths average 20 feet. Typical channel depths range between 1 and 2 feet, with a thalweg depth of 2.5 to 3 feet. Downed wood is nearly absent from the stream channel. Only 11 pieces were observed during stream surveys of Clear Creek on the Bank, primarily small to medium sizes (less than 12 inches in diameter).

Clear Creek and its riparian zone on the Bank contain mainly degraded habitat conditions with few areas of intact riparian habitat. Reed canarygrass generally dominate the right (east) bank of the narrow riparian corridor, which lack mature woody vegetation. The dominant vegetation on the left (west) bank is a mixture of native trees and shrubs with scattered invasive vegetation.

Throughout the Bank, Clear Creek predominantly serves as a migration corridor for salmonids en route to spawn in upper reaches (below the fish passage barrier at RM 1.9), as well as in tributary streams including Swan, Squally, and Canyon creeks. There is a lack of spawning habitat on the Bank, primarily due to the low gradients unable to maintain suitable gravel substrates in the stream.

A3.2.8 Fish Habitat

Several salmonid species are identified in Clear Creek up to RM 1.9, where a diversion dam serves as a barrier for anadromous fish passage (Table A5) (Pierce County, 2006; Washington Department of Fish and

Wildlife [WDFW], 2013b). Reticulate sculpin (*Cottus perplexus*), river lamprey (*Lampetra ayresii*), and Pacific lamprey (*Lampetra tridentata*) may also occur in Clear Creek.

TABLE A5. SALMONID UTILIZATION OF CLEAR CREEK

Common Name	Scientific Name	Presence
Winter steelhead trout	Oncorhynchus mykiss	Presence presumed
Coho	Oncorhynchus kisutch	Known spawning
Fall chum	Oncorhynchus keta	Documented presence
Pink	Oncorhynchus gorbuscha	Documented presence
Fall Chinook	Oncorhynchus tshawytscha	Documented presence
Cutthroat trout	Oncorhynchus clarki	Documented presence
Bull trout	Salvelinus confluentus	Documented presence

The matrix of diagnostics/pathways and indicators developed by USFWS for bull trout (*Salvelinus confluentus*) (USFWS, 1998) was used to document the environmental baseline conditions in the Clear Creek subbasin and the potential effects of the habitat restoration project on the relevant indicators for bull trout (Table A5). These indicators and the associated rating criteria are based on scientific data related to the freshwater habitat requirements of bull trout (USFWS, 1998). The functionality of each indicator was evaluated according to the criteria established by the USFWS for fresh water and is rated as follows: **properly functioning, functioning at risk,** or **functioning at unacceptable risk.**

The USFWS matrix was combined with the matrix of pathways and indicators developed by National Marine Fisheries Service (NMFS) (1996) for Pacific salmon to determine the status of the freshwater indicators for Pacific salmon in the Clear Creek subbasin. The functionality of each indicator was evaluated in terms of the criteria established by NMFS and is rated as follows: **properly functioning, at risk**, or **not properly functioning.**

Table A6 summarizes freshwater conditions and is followed by a more detailed discussion of the indicators in Clear Creek.

TABLE A6. MATRIX OF DIAGNOSTICS/PATHWAYS AND INDICATORS SHOWING ENVIRONMENTAL BASELINE CONDITIONS

Pathways:	Environmental Baseline Condition				
Indicators	Properly Functioning	Functioning at Risk (at Risk)	Functioning at Unacceptable Risk (Not Properly Functioning)		
Bull Trout Subpopulation Characteristics:					
Bull trout subpopulation size			lacksquare		
Bull trout growth and survival					
Bull trout life history diversity and isolation					
Bull trout persistence and genetic integrity			☑		
Water Quality:					
Temperature					
Sediment/turbidity					
Chemical contamination/nutrients			lacksquare		
Habitat Access:					
Physical barriers					
Habitat Elements:					
Substrate embeddedness					
Large woody material			lacksquare		
Pool frequency and quality					
Off-channel habitat			lacksquare		
Refugia					
Channel Conditions/Dynamics:					
Wetted width/maximum depth ratio	\checkmark				
Stream bank condition		\checkmark			
Floodplain connectivity			\checkmark		
Flow/Hydrology:					
Change in peak/base flows					
Drainage network increase			\square		
Watershed Conditions:					
Road density and location			\checkmark		
Disturbance history					
Riparian reserves			lacksquare		

Notes:

Gray shading identifies an indicator specific to bull trout. Blue shading identifies an indicator that applies to all listed salmonids (Herrera, 2013c).

A3.2.8.1 Bull Trout Subpopulation Characteristics

Bull trout populations in the Puyallup River basin (including Clear Creek) are low and at risk of extinction, as evidenced by the listing under the ESA. All components of the subpopulation: subpopulation size, growth and survival, life history diversity and isolation, and persistence and genetic integrity are **not properly functioning.**

A3.2.8.2 Water Quality

Temperature

The lack of riparian vegetation in the lower reaches of Clear Creek, along with multiple inputs of storm water from urbanized areas, contributes to temperatures outside the range best suited for salmon for at least part of the year.

Clear Creek is not on Ecology's Clean Water Act Section 303(d) list for high temperatures. Stream temperature was recorded at 14°C during site visit on March 1, 2013, prior to conducting habitat restoration at the Bank. This temperature is at risk for bull trout rearing habitat (13°C to 15°C) and Chinook salmon migration and rearing habitat (14°C to 18°C). Although stream temperatures are in the range of at risk for part of the year, during the summer months temperatures likely increased to the point where this indicator is **not properly functioning.**

Sediment/Turbidity

Substrate fines are a limiting factor throughout the Clear Creek subbasin where fish have access (Puyallup Tribal Fisheries, 2011). Silt is the predominant substrate material observed within the channel during stream surveys. Based on the available data and the extensive alteration of Clear Creek that has resulted from urbanization and agricultural practices, the sediment indicator is **not properly functioning** at the Bank (i.e., greater than 17 percent fines) for Chinook salmon, steelhead trout, and bull trout.

Chemical Contamination/Nutrients

Clear Creek receives runoff from single-family residential areas. Storm water runoff is a limiting factor identified by the Puyallup Tribe (Puyallup Tribal Fisheries 2011). In addition, Clear Creek receives runoff from agricultural areas. Clear Creek is on Ecology's Clean Water Act Section 303(d) list of impaired waterways because of the observed concentrations of fecal coliform bacteria (Ecology 2013). The chemical contamination/nutrients indicator for Clear Creek is **not properly functioning** for Chinook salmon, steelhead trout, and bull trout because more than one reach of the creek is listed on Ecology's 303(d) list.

A3.2.8.3 Habitat Access

Habitat access in the Clear Creek watershed is **not properly functioning** because of a fish blockage in the form of a cement diversion dam located at RM 1.9 to ensure pathogen-free water for hatchery-raised rainbow trout at a private trout farm (Puyallup Tribal Fisheries 2011).

A3.2.8.4 Habitat Elements

Substrate

The substrate indicator is **not properly functioning** because sand and silt substrate is dominant within portions of Clear Creek that are accessible to anadromous fish. Only a small portion of the stream provides spawning habitat between approximately RM 1.7 and RM 1.9 (Puyallup Tribal Fisheries 2011).

Large Woody Material

The LWM indicator is a limiting factor in Clear Creek, and there is limited opportunity for potential recruitment throughout the system due to the overall lack of large riparian trees. During field visits to Clear Creek within the project limits, LWM is rare. Only 11 pieces were identified during stream surveys. Therefore, the LWM indicator is **not properly functioning.**

Pool Frequency and Quality

The pool frequency and quality indicator is **not properly functioning** because glide habitat, which lacks pools, is the dominant habitat type within portions of Clear Creek accessible to anadromous fish. Furthermore, the lack of LWM within these reaches contributes to low pool density.

Off-channel Habitat

The off-channel habitat indicator is **not properly functioning** because channel confinement is a limiting factor for Clear Creek (Puyallup Tribal Fisheries 2011). Agricultural practices have resulted in a straightened channel that lacks side channels and other off-channel habitats. Mitigation measures directly upstream of the Clear Creek confluence with the Puyallup River have provided side channels; however, overall the Clear Creek system is lacking off-channel habitat.

Refugia

Although some intact patches of refugia occur along Clear Creek, these areas are limited because agriculture activity in the lower watershed eliminated most of the refugia. Some refugia exists in the upper watershed, but these areas are not accessible to fish. Therefore, the refugia indicator is **not properly functioning.**

A3.2.8.5 Channel Conditions/Dynamics

Wetted Width/Maximum Depth Ratio

Based on field surveys of the UCCMS, the wetted width/maximum depth ratio is 8.5 (see *Biological Evaluation – Upper Clear Creek Mitigation Site* Table C1, Appendix C [Herrera 2013c]), which is **properly functioning** for bull trout, Chinook salmon and steelhead trout.

Stream Bank Condition

Based on field surveys of the UCCMS, the stream bank condition is *functioning at risk*. In general, the right (west) bank of Clear Creek on the Bank lacks woody vegetation and showed signs of erosion on 10 to 20 percent of the bank.

Floodplain Connectivity

The Clear Creek subbasin is subject to urban stream flooding that "...occurs when runoff exceeds the conveyance capacity of natural and manmade drainage systems, and typically occurs with moderate- to high-intensity storms that can last for several days or occur in succession over a period of weeks" (Pierce County 2006). During periods of low flow and low-intensity storms, Clear Creek flows are confined within the channel. Channel confinement is identified as a limiting factor for Clear Creek (Puyallup Tribal Fisheries 2011). Surrounding agricultural practices, including the side-cast berm levee, and urban development have largely eliminated high functioning floodplain habitat. Therefore, the floodplain connectivity indicator is **not properly functioning**.

A3.2.8.6 Flow/Hydrology

Change in Peak/Base Flows

Urban development surrounds the headwaters of Clear Creek and contributing tributaries, which results in frequent, high peak flows when compared to watersheds of similar size with less urban development. Base flow in Clear Creek is supported by a groundwater table that is consistently high in the vicinity of the Bank attributed to the location on floodplain alluvium near the Puyallup River. During wet winter months, the high groundwater table causes increased soil saturation, reduced capacity for infiltration of stormwater runoff, and subsequent increases in peak rates and volumes of runoff over the land surface. Therefore, the change in peak/base flows indicator is **not properly functioning.**

Increase in Drainage Network

The active channel length of Clear Creek substantially increased in the early 1900s when the Puyallup River was straightened and levees were constructed. At this time, a large meander bend in the Puyallup River was eliminated. Clear Creek and Swan Creek historically flowed into this meander bend. When the meander bend was eliminated, Clear Creek was lengthened approximately 0.5 miles to a new discharge location at the Puyallup River, and Swan Creek was realigned to flow into Clear Creek. Therefore, the increase in drainage network indicator is **not properly functioning**.

A3.2.8.7 Watershed Conditions

Road Density and Location

In the vicinity of the Bank, the road density is approximately 20 miles per square mile. Throughout the Clear Creek subbasin, the road density exceeds 3 miles per square mile. In addition, Pioneer Way East and State Route (SR) 167 represent valley bottom roads in close proximity to Clear Creek along those reaches of the stream that occur in the Puyallup River floodplain. Therefore, the road density and location indicator is **not properly functioning.**

Disturbance History

The Clear Creek subbasin has a long history of disturbance. The natural hydrology was substantially altered when the Puyallup River was straightened and flood gates were installed within the Puyallup River levee. Surrounding agriculture and residential development has resulted in a confined channel that is disconnected from floodplain habitats. A constructed dam prevents upstream anadromous fish migration to spawning habitat. Therefore, the disturbance history indicator is **not properly functioning.**

Riparian Reserves

Agricultural and residential development surrounding Clear Creek has displaced and fragmented the surrounding riparian reserve system. Therefore, the riparian reserves indicator is **not properly functioning**.

A3.2.9 Baseline Terrestrial Wildlife Habitat

Several species of wildlife were observed using the Bank during site reconnaissance, including song birds, raptors and small mammals (Grette 2012). Song birds observed at the site include common yellowthroat (Geothlypis trichas), marsh wren (Cistothorus palustris), song sparrow (Melospiza melodia), Steller's jay (Cyanocitta stelleri), barn swallow (Hirundo rustica), and tree swallow (Tachycineta bicolor). Red-tailed hawk (Buteo jamaicensis) was also observed at the site. Signs of small mammals were observed indicating use of the site by raccoon (Procyon lotor), beaver (Castor Canadensis) and coyote (Canis latrans). In addition, great blue heron (Ardea herodias) were observed flying over and near the property.

Documented presence of regulated terrestrial wildlife species and nests of bird species occurring in the Bank vicinity include a great blue heron rookery mapped as occurring outside of the project site (WDFW 2013a). The rookery was observed in use during field surveys. Approximately 20 great blue heron were observed foraging within the Bank. Great blue heron is a WDFW priority species classified as a vulnerable aggregation and is listed by the state as a monitor species (WDFW 2008, 2013a). In addition, there are other regulated species in the general vicinity that could periodically fly over, or forage on the site. The other documented occurrences of regulated species within the project vicinity are:

- Bald eagle (Haliaeetus leucocephalus). A nest is located approximately 800 feet from the Bank (WDFW, 2013a). Bald eagle is a WDFW priority species classified as a state listed sensitive species.
- Big brown bat (Eptesicus fuscus). A maternity colony is located on a bridge approximately 4,200 feet from the Bank (WDFW 2013a). Big brown bat is a WDFW priority species classified as a vulnerable aggregation (WDFW 2008).

The wildlife habitat present on or in the vicinity of the Bank are:

- Snag-rich areas and downed logs
- Waters of the state (Clear Creek) and the adjacent riparian areas
- Wetlands
- Heron rookeries
- Waterfowl concentrations
- Cavity duck nesting habitat

Although several other rare animals and species of rare plants occur in Pierce County, there are no documented occurrences of these species within a mile of the Bank, nor were they observed during habitat surveys.

A4.0 POST-RESTORATION CONDITIONS AND ANTICIPATED FUNCTIONAL LIFT OF WETLANDS AND OTHER AQUATIC AREAS IN THE FLOODPLAIN

The Bank has been extensively impacted for over a century. Wetland A has been fragmented, degraded and filled, which drastically altered the hydrology through tiling and ditching, the soils from plowing and fertilizing, and the vegetation through grazing, planting of monoculture species and allowing invasive species to dominate the landscape. Restoration actions to be completed at the Bank will re-establish and rehabilitate high quality riverine Category I wetland habitat and create a mosaic of forested, scrub-shrub, emergent and riverine wetland conditions as described below. Wetland A was rated according to post-restoration site conditions. Table A7 depicts the wetland points scored on the rating form based on post-restoration site conditions as compared to baseline site conditions.

TABLE A7. BASELINE AND POST-RESTORATION WETLAND RATING FORM RESULTS

	Improving Water Quality		Hydrologic		Habitat	
Function	Baseline Conditions	Post- Restoration Conditions	Baseline Conditions	Post- Restoration Conditions	Baseline Conditions	Post- Restoration Conditions
Site Potential	Moderate	Moderate	High	High	Moderate	High
Landscape Potential	High	High	Moderate	High	Low	Low
Value	High High		High	High	High	High
Score Based on Ratings	8 8 9 6 7					
Baseline Conditions Wetland Category	II (22 total points)					
Post-Restoration Conditions Wetland Category	I (24 total points)					

The mitigation actions will create a diverse wetland system that scores high for water quality, hydrologic and habitat functions. The post-restoration wetland scored high for water quality functions due to the vegetation coverage of herbaceous and woody species, being within 150 feet of development and discharging to Clear Creek which is on the 303(d) list (i.e. source of pollution) and being within a water resource inventory area (WRIA) that has a total maximum daily load (TDML). The wetland scores high for hydrologic functions because of the vegetation coverage, re-routing the stream and creating floodplain habitat and being within an area Pierce County has identified as important to help downstream flooding. The wetland scores high for habitat because it will have multiple vegetation classes (emergent, shrub and forested) and high amount of habitat interspersion with snags and large woody debris (LWD). The wetland will also provide habitat to threatened and endangered fish species and provide habitat for priority species such as great blue heron and eagles.

Beneficial effects of the project include:

- Improved riparian habitat along Clear Creek
- Restored and expanded stream channels
- Expanded and enhanced wetland and buffer conditions
- Rehabilitated riverine wetland habitat
- Created new off-channel refuge and rearing habitat for fish species
- Increased floodplain storage

The overall UCCMS habitat restoration project, including the Bank and the EPA site, will provide long-term ecological benefits to a significantly degraded area. The restored channel and off-channel habitat areas will be enlarged, and riparian areas will be enhanced with native vegetation. Adjacent wetland areas will be expanded and rehabilitated by removing the side-cast berm levee, drainage ditches and drain tiles and establishing native riparian wetland vegetation to restore riverine wetland functions. In addition, LWM and standing snags will be placed in the floodplain wetland, which will improve wildlife habitat quality and quantity.

The Bank will mature into a diverse complex of riparian forested, scrub-shrub, and emergent wetland areas, structurally complex in-stream habitat for salmonids, and enhanced buffers to provide additional protection and functions.

A4.1 Post-Restoration Functions

Post-restoration site conditions were assessed to identify the functional lift of the wetland and stream (fish conservation) mitigation areas. The project uses an ecosystem restoration approach to improve hydrologic, water quality and habitat functions across 28.64 acres of riverine wetland, stream and buffer habitat. Below is a qualitative description of functions that are expected to be provided by the Bank once all phases have been completed. Post-restoration functions were assessed using the 2014 Ecology wetland rating system, the Credit-Debit method and best professional judgment.

A4.1.1 Post-Restoration Wetland Functions

The baseline conditions of the wetland were rated according to the Ecology 2014 wetland rating system. According to the 2014 rating, the then-existing conditions rated as a Category II system (see Table A3).

Through the proposed re-establishment, rehabilitation, and enhancement activities, the wetland is expected to become a Category I wetland with an increased total score of 24 points under the wetland rating system. This represents a 2-point lift, which is due to the following activities:

- Water Quality Functions: Based on the scores of the wetland rating system, water quality functions will not change significantly. However, the baseline wetland received a high score largely due to the dense colony of invasive reed canarygrass. In general, emergent vegetation, woody-stemmed shrubs, downed wood (LWM structures), and other surface roughening features act to remove pollutants. The Bank proposed installation of native emergent vegetation and woody-stemmed shrubs, LWM structures, and hummocks, which will roughen the wetland surface and slow flows, increasing the wetlands ability to remove sediments, nutrients and toxins from surface flows. In addition, the wetland size will be expanded, creating additional opportunities for the wetland to improve downstream water quality, and agricultural activities previously conducted on the landscape will be removed from the wetland. Installing dense native vegetation communities and surface roughening structures and removing past agricultural activities will improve water quality functions of Wetland A.
- Hydrologic Functions: Clear Creek is situated in a straightened channel and is cut off from historic floodplain habitat by the side-cast berm levee at low to moderate flood flows. The project will re-route the stream and connect the wetland to historic floodplain areas and re-engage Clear Creek with the wetland floodplain during all flood flows. In addition, wetlands play a role in moderating water level fluctuations. Vegetation impedes the flow of runoff and allows it to infiltrate into the ground. Woody vegetation, such as shrubs and trees, slow surface water flow and help control runoff that eventually drains into streams or other wetlands. The proposed surface roughening structures such as LWM and hummocks will also serve to slow flows and encourage infiltration of surface waters. Clear Creek has been identified as a stream that regularly floods and Pierce County has identified the project area for floodplain reconnection to prevent additional flooding. The project will remove the side-cast berm levee, re-meander stream channels through the floodplain wetland, install shrub and forested habitats, LWM structures, pools and off-channel habitat that will help increase hydrologic functions.
- Habitat Functions: The restoration actions will reduce the amount of invasive plants, increase habitat diversity with a diverse assemblage of native trees, shrubs and emergent species, provide standing

snags and LWM structures, re-meander the stream channel, add off channel habitat, and provide hummocks for additional habitat interspersion. Therefore, the post-restoration wetland scores higher for habitat functions points than the baseline conditions wetland. Habitat functions further increased because human activities (historic agricultural use) will be removed from the site and the stream channel will be rerouted from the straightened channel to meander throughout the Bank. Habitat functions will greatly improve at the Bank because native vegetation will be added to Wetland A and buffer, pools and off-channel habitat will be created, and LWM will be added to the stream channels, hummocks and throughout Wetland A.

A4.1.2 Post-Restoration Fish Habitat Functions

The creation of channels and PAB ponds in the wetland floodplain will improve rearing, foraging and refuge habitat for fish. The installation of large wood structures, including downed LWM and standing snags, will improve habitat functions by providing habitat for fish species.

The matrix of diagnostics/pathways and indicators developed by USFWS for bull trout (USFWS 1998), and a similar matrix developed by NMFS for Pacific salmon (NMFS 1996) were combined to summarize environmental baseline conditions of the Clear Creek subbasin and project effects on relevant indicators for bull trout and other listed salmonids (Table A8).

The effect of the project on the functionality of each indicator was then determined at the project area scale. This determination consisted of evaluating whether the project *improves, maintains*, or *degrades* the functionality of each indicator. Table A8 summarizes freshwater conditions in the project area and the impacts of the completed project.

A4.1.2.1 Bull Trout Subpopulation Characteristics

The Bank project will not affect bull trout subpopulation size, growth and survival, life history diversity and isolation, or the persistence or genetic integrity of the project. Therefore, the project *maintains* these indicators at not properly functioning.

A4.1.2.2 Water Quality

Water Temperature

Restoration and mitigation at the Bank will increase riparian vegetation in the Clear Creek basin and, as riparian vegetation matures, likely *improves* the status of the temperature indicator in the basin. The groundwater discharges from the site are expected to consist of clean, cool water that may improve water quality downstream of the Bank.

Sediment and Turbidity

The project will not change the sediment and turbidity and, therefore, **maintains** the status of this indicator for salmonids at not properly functioning.

TABLE A8. MATRIX OF PATHWAYS AND INDICATORS SHOWING ENVIRONMENTAL BASELINE CONDITIONS AND ENVIRONMENTAL EFFECTS

Pathways:	Environmental Baseline Condition		Effect of Bank			
Indicators	Properly Functioning	Functioning at Risk (at Risk)	Functioning at Unacceptable Risk (Not Properly Functioning)	Improves	Maintains	Degrades
Bull Trout Subpopulation Chara	cteristics:					
Bull trout subpopulation size			$\overline{\checkmark}$		$\overline{\checkmark}$	
Bull trout growth and survival					$\overline{\checkmark}$	
Bull trout life history diversity and isolation			$\overline{\checkmark}$			
Bull trout persistence and genetic integrity			$\overline{\checkmark}$			
Water Quality:						
Temperature				\checkmark		
Sediment/turbidity					$\overline{\checkmark}$	
Chem. contamination/nutrients					\checkmark	
Habitat Access:						
Physical barriers			\checkmark		\checkmark	
Habitat Elements:						
Substrate embeddedness					\checkmark	
Large woody material						
Pool frequency and quality						
Off-channel habitat						
Refugia						
Channel Conditions/Dynamics:						
Wetted width/max. depth ratio	\checkmark					
Stream bank condition		\checkmark		\checkmark		
Floodplain connectivity			$\overline{\checkmark}$	\checkmark		
Flow/Hydrology:						
Change in peak/base flows			\square		$\overline{\checkmark}$	
Drainage network increase			\square		\checkmark	
Watershed Conditions:						
Road density and location			$\overline{\checkmark}$		\checkmark	
Disturbance history			\square		$\overline{\checkmark}$	
Riparian reserves			$\overline{\checkmark}$			

Note:

Gray shading identifies an indicator specific to bull trout. Blue shading identifies an indicator that applies to all listed salmonids (Herrera, 2013c).

Chemical Contamination/Nutrients

Herbicide use is the only potential project-related chemical release that could affect aquatic organisms. Potential herbicide use for vegetation management activities poses a moderate risk to aquatic organisms, based on effects identified in a risk assessment completed to determine the potential of herbicide use to adversely affect aquatic biota (Washington State Department of Transportation [WSDOT] 2005).

Appropriate use and application of herbicides as a last resort in vegetation management should not result in an increase in contamination above background levels. Regular flooding events mobilize herbicides, pesticides, petroleum products and other contaminants from throughout the Clear Creek basin, all of which flow through Clear Creek. Incidental overspray misapplication likely **maintains** the chemical contamination status of Clear Creek at not properly functioning.

A4.1.2.3 Habitat Access

The project will not restrict or enhance fish passage in the project area or surrounding vicinity. Therefore, the project *maintains* this indicator at not properly functioning.

A4.1.2.4 Habitat Elements

Substrate Embeddedness

The project will not affect the substrate of Clear Creek. Substrate appropriate for fish use is proposed in floodplain channels. Based on these factors, the project **maintains** this indicator at not properly functioning.

Large Woody Material

Habitat enhancement at the Bank includes adding approximately 118 LWM structures, each consisting of several logs. In addition, planting native tree species will support long-term recruitment of LWM. Therefore, the construction of the Bank *improves* the status of this indicator in the Clear Creek basin.

Pool Frequency and Quality

The project will enhance pool frequency and quality through installation of two pool forming structures within the Bank. Therefore, the project *improves* this indicator.

Off-channel Habitat and Refugia

The project will re-establish riparian forest and will restore stream channels, create off-channel habitat and PAB ponds and increase floodplain storage capacity. These features, and the proposed habitat structures within these areas (downed logs, native vegetation), *improves* off-channel habitat and refugia in Clear Creek.

A4.1.2.5 Channel Conditions/Dynamics

Wetted Width/Maximum Depth Ratio

The project will not adversely affect wetted width/maximum depth ratio. Therefore, the project **maintains** this indicator at properly functioning.

Stream Bank Condition

The project *improves* the stream bank condition along both banks of restored floodplain channels and Clear Creek at the Bank by removing invasive vegetation, installing LWM structures, submerged vegetated benches, and alcoves along the stream banks, and planting native vegetation, including trees and shrubs.

Floodplain Connectivity

The project substantially **improves** floodplain connectivity within this section of Clear Creek. The project creates and restores a network of channels, removes the side-cast berm levee adjacent to Clear Creek, and increases floodplain storage capacity. All of these features will provide enhanced floodplain connectivity.

Hydrology

The project creates features (floodplain storage, expression of groundwater in excavated areas) that may modestly reduce peak flows or increase base flows. However, these effects will not substantially change hydrologic conditions in Clear Creek. There will be a similarly small change (increase) in the drainage network. Therefore, the project *maintains* these indicators at not properly functioning.

A4.1.2.6 Watershed Conditions

Road Density and Location

The project will not affect road density or location in the project area or surrounding vicinity. No changes to roads will be conducted as part of this project. Therefore, the project **maintains** this indicator at not properly functioning.

Disturbance History

The project will not affect the disturbance history of the Clear Creek watershed. Therefore, the project *maintains* this indicator at not properly functioning.

Riparian Reserves

The project *improves* riparian reserves within this section of Clear Creek. The project will re-establish riparian areas and surrounding upland riparian forest, and create off-channel habitats including channels and PAB ponds. All of these features will enhance riparian reserves.

A4.1.2.7 Wildlife Habitat Functions

The project **improves** habitat for great blue heron, raptors, and other birds as result of installing standing snags and will continue to improve scrub-shrub and forested wetland vegetation in areas previously dominated by reed canarygrass. In addition, habitat niches will continue to form and improve the habitat functions of the Bank for birds, small mammals and other wildlife species as the site matures due to increased plant species richness, multiple vegetation strata, and development of undercut banks and overhanging vegetation along channels.

A5.0 WATERSHED RESTORATION NEEDS MET BY THE BANK

In accordance with joint regulatory agency guidance (WAC 173-700-300 (1); 173-700-302 (2); 173-700-303(1)(a)(i); and 173-700-314 (4)), the Bank location was selected using a watershed-based approach. In addition, the following demonstrated use of a watershed-based approach consistent with Ecology (2009) guidance titled, Selecting Wetland Mitigation Sites Using a Watershed Approach. This approach takes into consideration long-term sustainability of restoration actions, and suitability for replacing lost aquatic resource functions resulting from future development projects.

The Bank is located in the lower portion of the Puyallup Watershed (WRIA 10) in a freshwater environment that provides opportunities to improve watershed conditions and replace lost aquatic resource functions by re-establishing and rehabilitating emergent, scrub-shrub, and forested wetlands, and enhancing fish and wildlife habitat quality and quantity. In addition, the project will enhance herbaceous and residential uplands to forested condition.

Selection of the Bank for restoration is identified in the Clear/Clarks Creek Basin Plan (Pierce County 2006). Pierce County identifies the Clear Creek Stream Corridor Restoration as a high-priority capital improvement project (CIP) that involves restoring a 3,000-foot reach between Pioneer Way East and Gay Road. Pierce County recognizes the Port's overall UCCMS Project as a component of this CIP. The project addresses riparian and aquatic habitat degradation. In addition, in support of improving water quality conditions, acquisition of the Bank by the Port is consistent with a programmatic recommendation of Pierce County that prioritizes acquisition of riparian corridors through purchase or conservation easements. Acquisition of the site is also consistent with Pierce County's floodway buyback program which aims to purchase property within the Clear Creek/Puyallup River floodway (Figure A5 and A7) from willing landowners to relieve flooding over approximately 400 acres. The county plan includes the purchase of properties, the removal of structures, and the creation of a ring levee for flood storage.

Several habitat mitigation sites are located on or adjacent to Clear Creek immediately downstream of the Bank, including the Washington State Department of Transportation's Clear Creek-Riverside Mitigation Site located approximately 0.2 miles downstream from Gay Road. Other sites in the immediate vicinity (downstream) include the City of Tacoma's Swan Creek Restoration Site (0.75 miles downstream), and the Port's two Clear Creek Habitat Mitigation Sites (Phase II [0.8 miles downstream] and Phase I [1 mile downstream]) as shown on Figure A7. Also, the Port is considering purchasing additional properties and/or conservation easements adjacent to the Bank for preservation and/or restoration, which would further expand the permanently protected wetland and creek habitat in the subbasin. The existing habitat mitigation sites downstream of the Bank compliment the Port's Port-wide Mitigation Strategy as described in the Prospectus.

The Bank provides opportunities to restore critical riverine watershed processes that have been highly altered by past land uses. The Clear/Clarks Creek Basin Plan characterizes the lower Clear Creek aquatic and riparian habitat as highly disturbed by agricultural practices, flood control practices, and residential landscaping, which resulted in a channelized, ditch-like stream with limited complexity of the riparian community. The removal of meander bends eliminated fish refuge areas and disconnected the stream from the floodplain (Pierce County, 2006). Pierce County identified Clear Creek from Pioneer Way to Gay Road East encompassing the Bank reach as a riparian/aquatic habitat problem area due to the straightened channel reach and reduced riparian buffer. In addition, land use practices have resulted in removal of large areas of native riparian vegetation. Most of the Clear Creek riparian area is colonized by invasive species such as Himalayan blackberry and reed canarygrass.

According to Pierce County (2006), historical photographs and site plans for developments constructed prior to wetland regulations provide evidence that considerable wetland areas have been lost or altered in the Clear/Clarks Creek Basin due to urban development and agricultural land uses. To promote agriculture and other development, wetlands adjacent to streams in the Puyallup River valley, including Clear Creek, were lost by filling, dewatering with drainage tile, and channelizing of streams during the early 1900s. Altered wetlands in the valley where the Bank is located provide optimum physical conditions for wetland

restoration. In particular, the wetlands at and surrounding the Bank tend to be large and have potential to support a variety of habitat types due to their location at the confluence of Squally Creek and Clear Creek.

On the Bank, there are several signs of habitat disturbance and alteration of riverine wetland processes as a result of past agricultural land use. Historically, Clear Creek was straightened and channelized along the southwest edge of the valley to allow for development of agricultural fields. As a result, a side-cast berm levee was created on the east side of the stream that limits flooding of adjacent wetlands to periods of high flow. In addition, numerous drain tiles were installed and an east-west cross ditch was created to promote site drainage with discharge to Clear Creek through culverts beneath the side-cast berm levee. Natural floodplain vegetation communities were cleared, and the land was filled and graded to support crops and pasture. In the time since agriculture practices were abandoned, large portions of the fields had reverted to emergent wetlands dominated by invasive reed canarygrass. Figures A8 through A11 show historic aerial imagery of the site in 1931, 1940, 1950 and 1973.

As a result of the flood protection provided by Puyallup River levees, additional land use development has encroached on the floodplain in the vicinity of the Bank including residences and roadways.

Restoration activities are suitable at the Bank based on Ecology (2009) guidance for the following reasons:

- Historic site alterations that degraded fish and wildlife habitat will be addressed.
- Mitigation activities will restore riverine wetland functions, which is the appropriate hydrogeomorphic (HGM) class for the Bank.
- Clear Creek is the appropriate source of water to the mitigation site based on the riverine wetland HGM class.
- Clear Creek provides an adequate supply of water to maintain wetlands with no long-term hydrologic control or maintenance needs.
- Adequate water supply and site flooding support development and maintenance of hydric soils.
- Site design includes aggressive measures to control invasive weeds including reed canarygrass.

A6.0 SUMMARY

In summary, the baseline wetland habitat and ecological floodplain functions at the Bank are severely impacted by nearly a century of human alterations. Straightening and channelizing the naturally meandering creek along the railroad grade and constructing the side-cast berm levee isolates Clear Creek from the adjacent floodplain and wetlands during most flows and creates fish stranding. Agricultural activities degraded wetland and fish habitat by removing native riparian vegetation, repetitive tilling, mowing and harvesting, altering wetland hydrology through drainage tiling and ditching, and allowing colonization of the site by invasive weeds such as reed canarygrass.

The Bank will improve wetland, fish, and wildlife habitat functions within the Bank by realigning and meandering Clear Creek, re-establishing floodplain connectivity, and re-establishing and rehabilitating a diversity of floodplain wetlands and associated fish and wildlife habitat including instream and terrestrial LWM structures, shallow vegetated benches, alcoves, hummocks, and improved off-channel habitat. In addition, the Bank will also improve flood storage during floods and return flow after floods, water quality,

recruitment of LWM, stream bank conditions, downstream erosion, water temperatures and riparian reserves. The Bank will consist of forested, scrub-shrub, and emergent wetlands that contain fish-bearing streams and off-channel habitat. This variety of complex, interconnected habitats are largely absent in the lower Puyallup River watershed. The Bank will provide significant and long lasting ecological and hydrologic benefit to the local environment and throughout a large portion of the lower Puyallup River watershed.

A7.0 REFERENCES

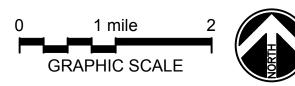
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Figure A1: Vicinity Map

Note: The locations of all features shown are approximate. This Figure is for informational purposes only and is intended to assist in showing features discussed in the attached document. Neither the Port of Tacoma nor any of it's staff or consultants makes any warranty of any kind for this information, express or implied, including but not limited to to any warranties or merchantability or fitness for a particular purpose, nor shall the distribution of this information constitute any warranty



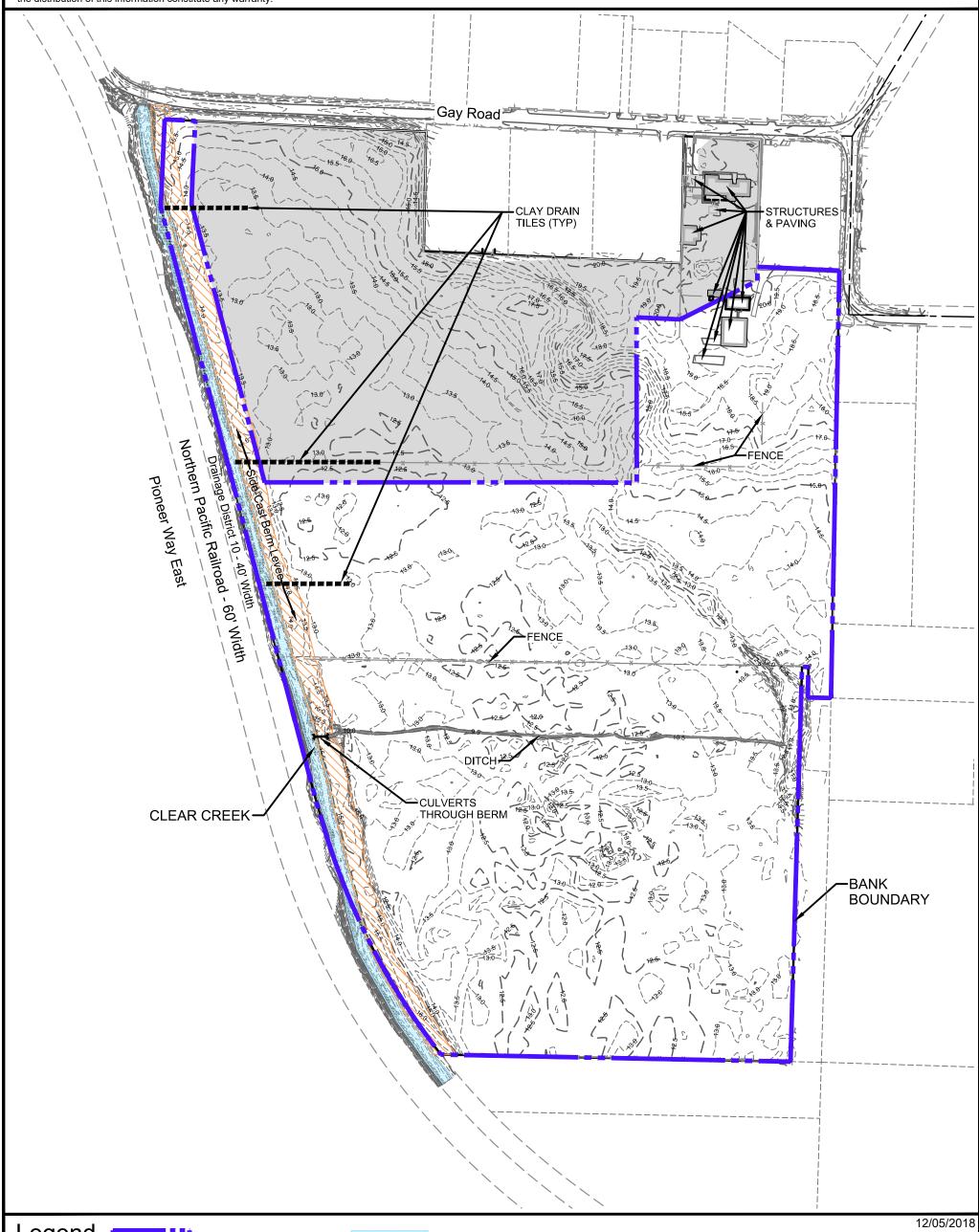


Thurston

Figure A2: Baseline Site Topography

<u>Note:</u> The locations of all features shown are approximate. This Figure is for informational purposes only and is intended to assist in showing features discussed in the attached document. Neither the Port of Tacoma nor any of it's staff or consultants makes any warranty of any kind for this information, express or implied, including but not limited to to any warranties or merchantability or fitness for a particular purpose, nor shall the distribution of this information constitute any warranty.





Legend







*Note: Acreage excludes 1.15 acres of non-bank areas, including EPA channels.



Reference: Imagery, data, and other features obtained and/or derived from Port of Tacoma Upper Clear Creek Mitigation Site (Project No. 098128, Contract No. 069593) topographic survey, construction drawings, and supplemental site field work.



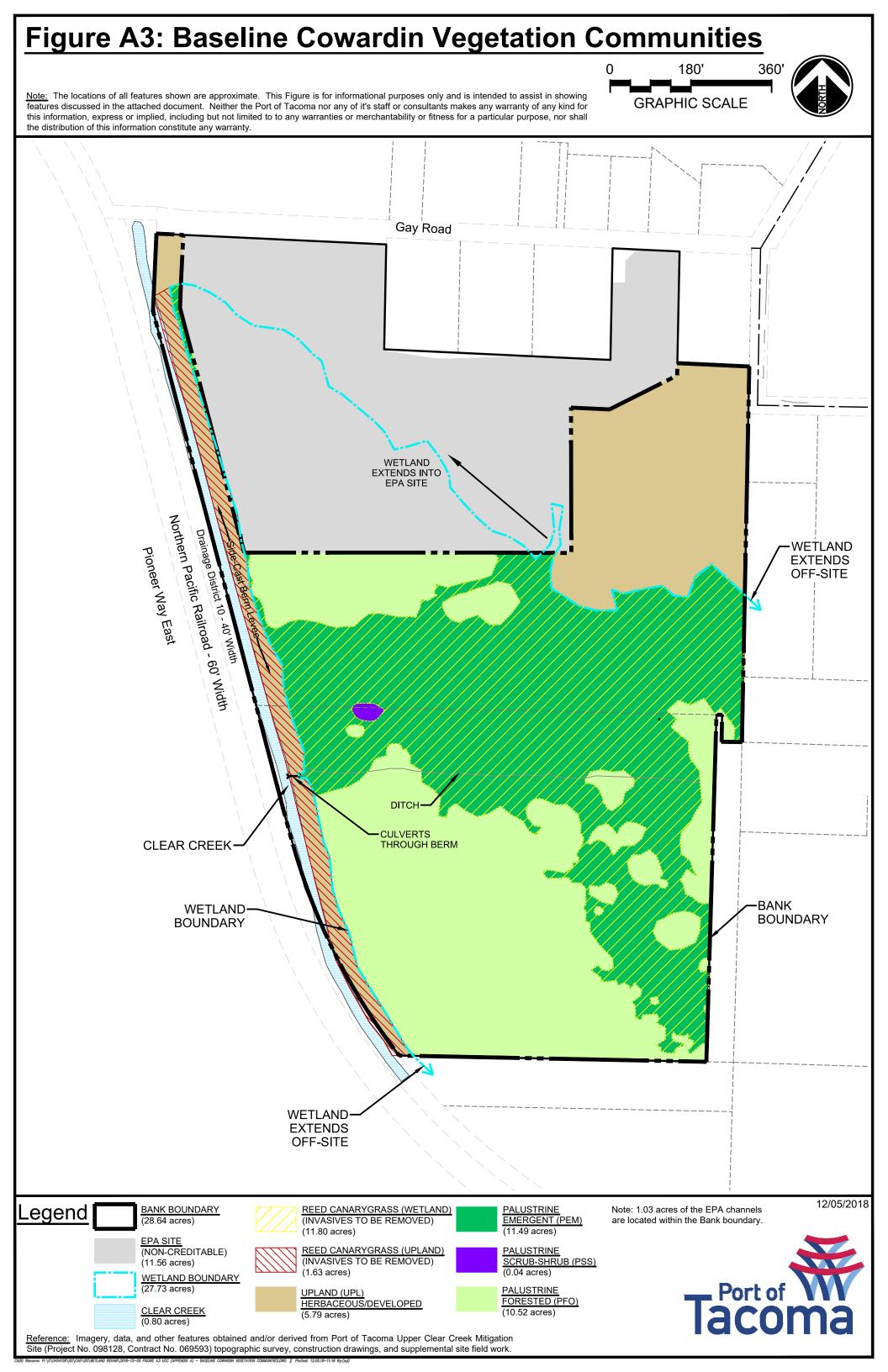
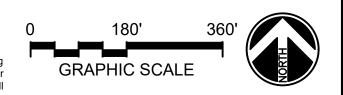
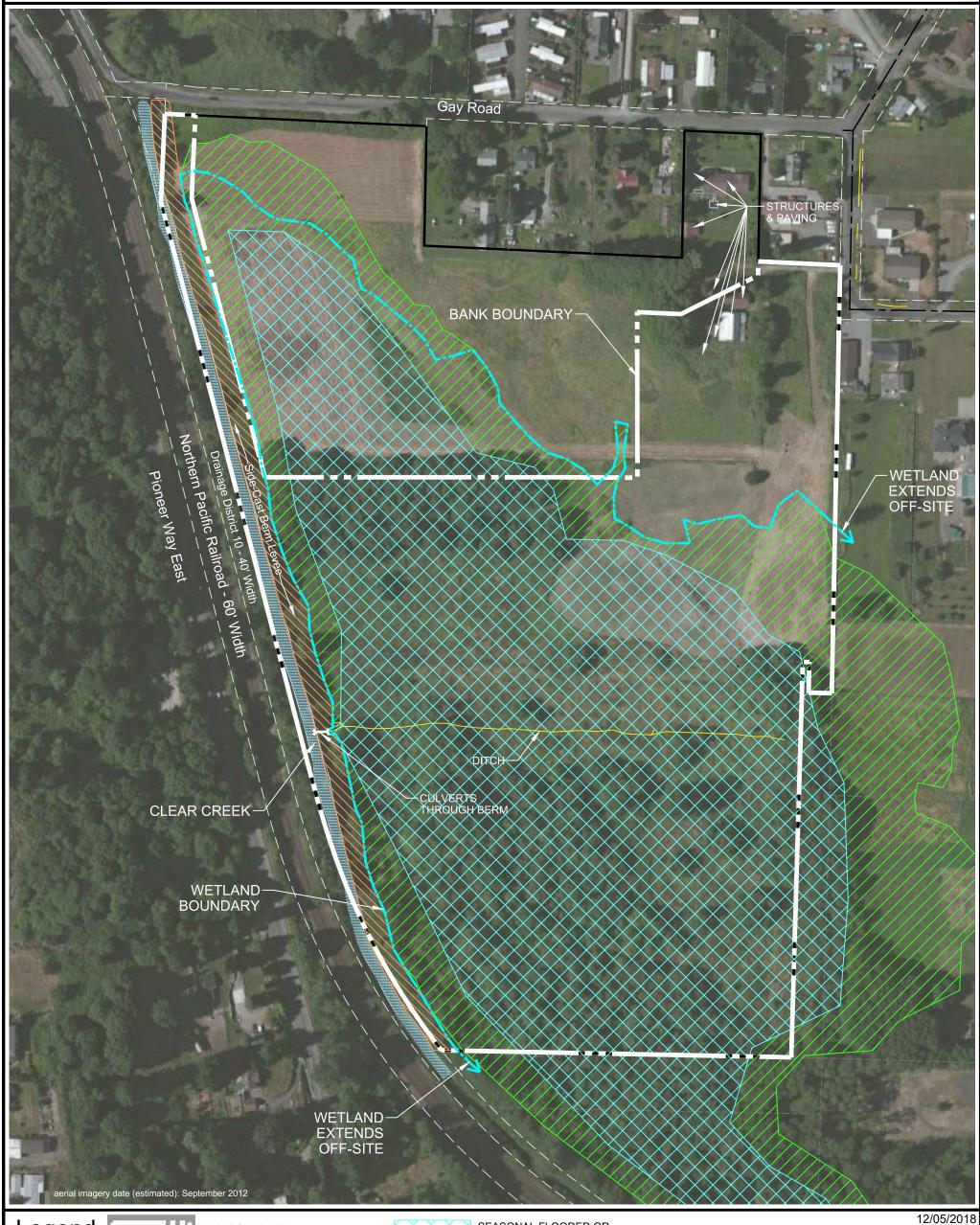


Figure A4: Baseline Hydroperiods

<u>Note:</u> The locations of all features shown are approximate. This Figure is for informational purposes only and is intended to assist in showing features discussed in the attached document. Neither the Port of Tacoma nor any of it's staff or consultants makes any warranty of any kind for this information, express or implied, including but not limited to to any warranties or merchantability or fitness for a particular purpose, nor shall the distribution of this information constitute any warranty.







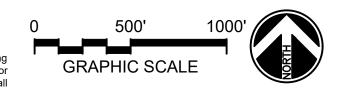


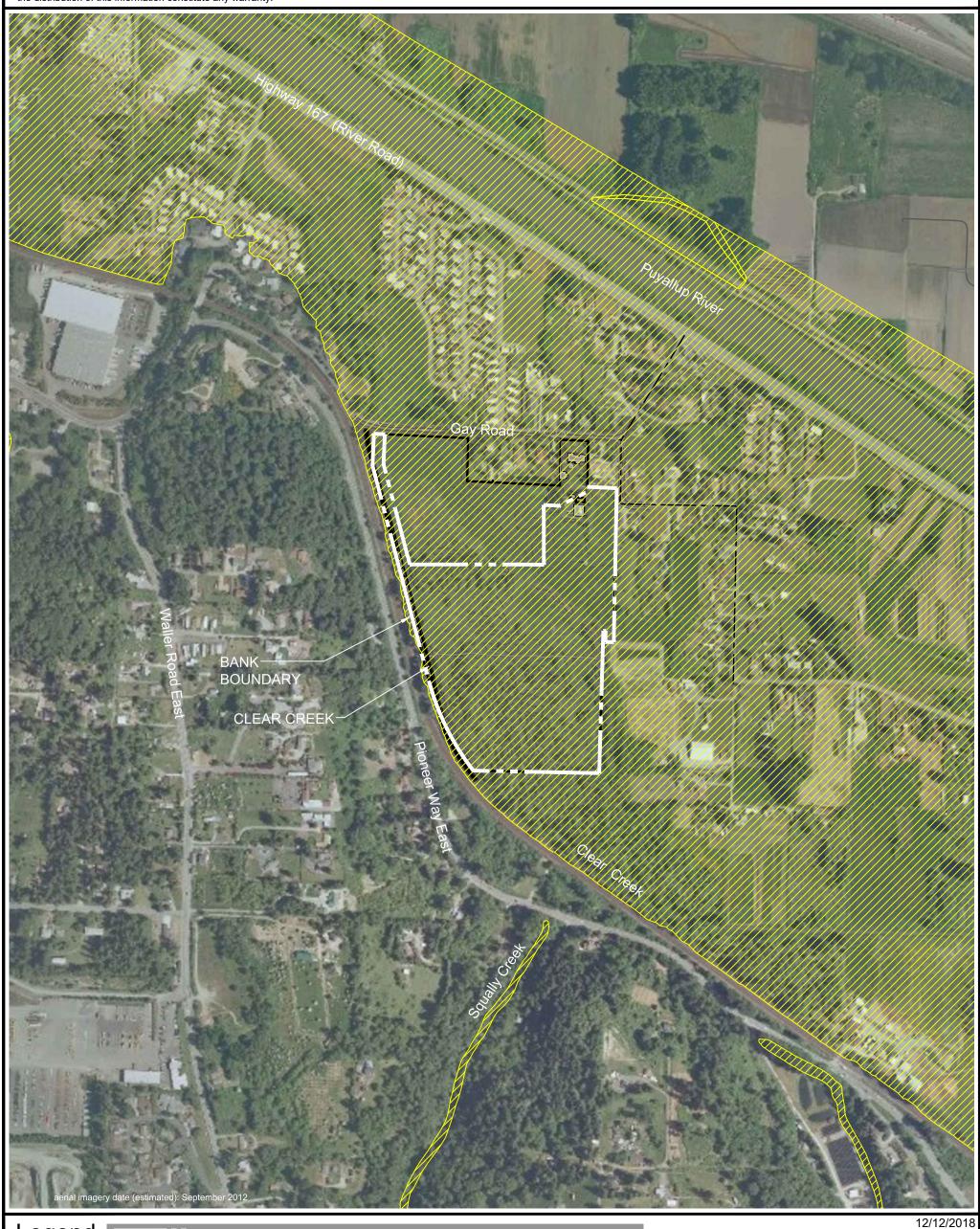


Reference: Imagery, data, and other features obtained and/or derived from Port of Tacoma Upper Clear Creek Mitigation Site (Project No. 098128, Contract No. 069593) topographic survey, construction drawings, and supplemental site field work.

Figure A5: Floodway Map

Note: The locations of all features shown are approximate. This Figure is for informational purposes only and is intended to assist in showing features discussed in the attached document. Neither the Port of Tacoma nor any of it's staff or consultants makes any warranty of any kind for this information, express or implied, including but not limited to to any warranties or merchantability or fitness for a particular purpose, nor shall the distribution of this information constitute any warranty.





Legend

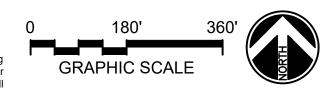
BANK BOUNDARY (28.64 acres)

FLOODWAY (OBTAINED FROM PIERCE COUNTY GIS FLOODWAY MAPPING, DATED 04/08/15)



Figure A6: NRCS Soil Survey Map

Note: The locations of all features shown are approximate. This Figure is for informational purposes only and is intended to assist in showing features discussed in the attached document. Neither the Port of Tacoma nor any of it's staff or consultants makes any warranty of any kind for this information, express or implied, including but not limited to to any warranties or merchantability or fitness for a particular purpose, nor shall the distribution of this information constitute any warranty.







		Piero
		Map Unit
8	Spoil Area	1D
٥	Stony Spot	'
00	Very Stony Spot	31A
7	Wet Spot	317
Δ	Other	39A
g.W.	Special Line Features	42A
ater Features		47F
Streams and Canals		l

and the second				
Pierce County Area, Washington (WA653)				
Map Unit Symbol Map Unit Name				
1D	Alderwood gravelly sandy loam, 15 to 30 percent slopes			
31A	Puyallup fine sandy loam			
39A	Snohomish silty clay loam			
42A	Sultan silt loam			
47F	Xerochrepts, 45 to 70 percent slopes			

.: http://websoilsurvey.nrcs.usda.gov Web Mercator (EPSG:3857) Web Soil Survey URL:

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of

the version date(s) listed below.

Soil Survey Area: Pierce County Area, Washington Survey Area Data: Version 10, Sep 15, 2015

Reference: Imagery, data, and other features obtained and/or derived from Port of Tacoma Upper Clear Creek Mitigation Site (Project No. 098128, Contract No. 069593) topographic survey, construction drawings, and supplemental site field work.



Figure A7: Clear Creek Restoration Sites, Floodway Parcels and Erosion Hazard

Note: The locations of all features shown are approximate. This Figure is for informational purposes only and is intended to assist in showing features discussed in the attached document. Neither the Port of Tacoma nor any of it's staff or consultants makes any warranty of any kind for this information, express or implied, including but not limited to to any warranties or merchantability or fitness for a particular purpose, nor shall the distribution of this information constitute any warranty.

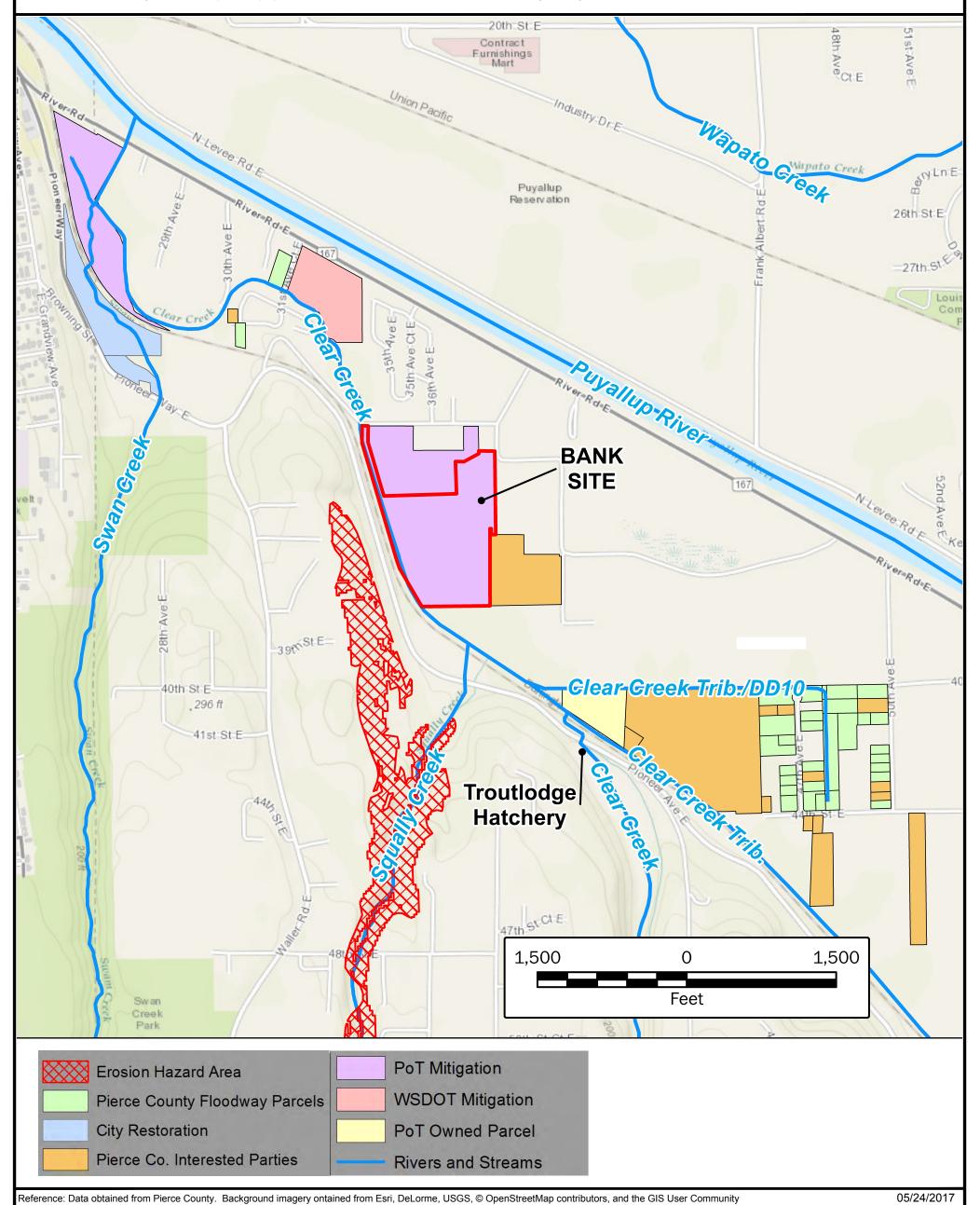
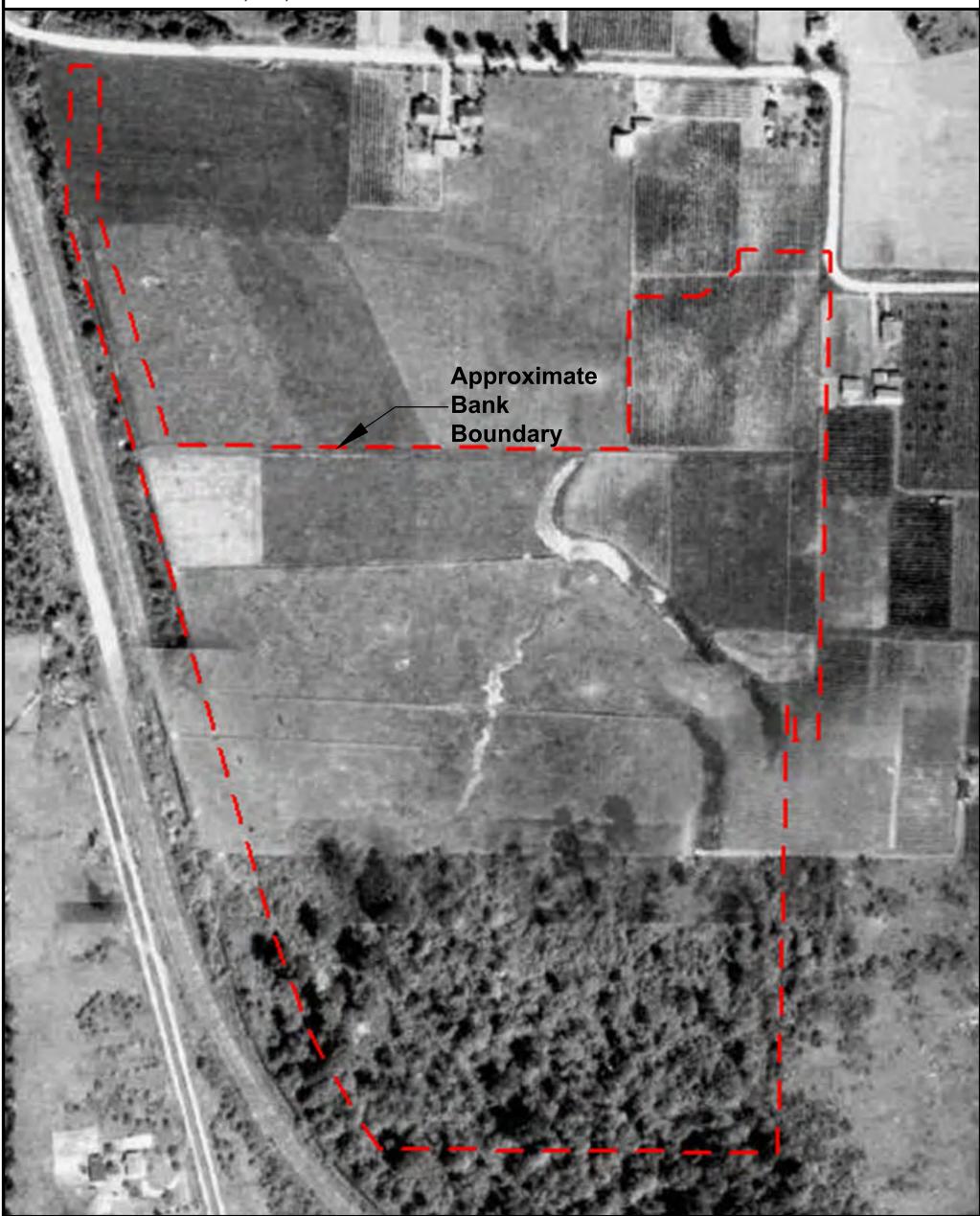




Figure A8: 1931 Aerial Photograph

Note: The locations of all features shown are approximate. Historic aerial imagery was not modified to fit the project site precisely, therefore the project boundary may be shifted in relation to the background imagery. This Figure is for informational purposes only and is intended to assist in showing features discussed in the attached document. Neither the Port of Tacoma nor any of it's staff or consultants makes any warranty of any kind for this information, express or implied, including but not limited to to any warranties or merchantability or fitness for a particular purpose, nor shall the distribution of this information constitute any warranty.





 $\label{thm:conditional} \textbf{Reference: Imagery shown is derived from aerial imagery found at GovMe website (www.govme.org).}$

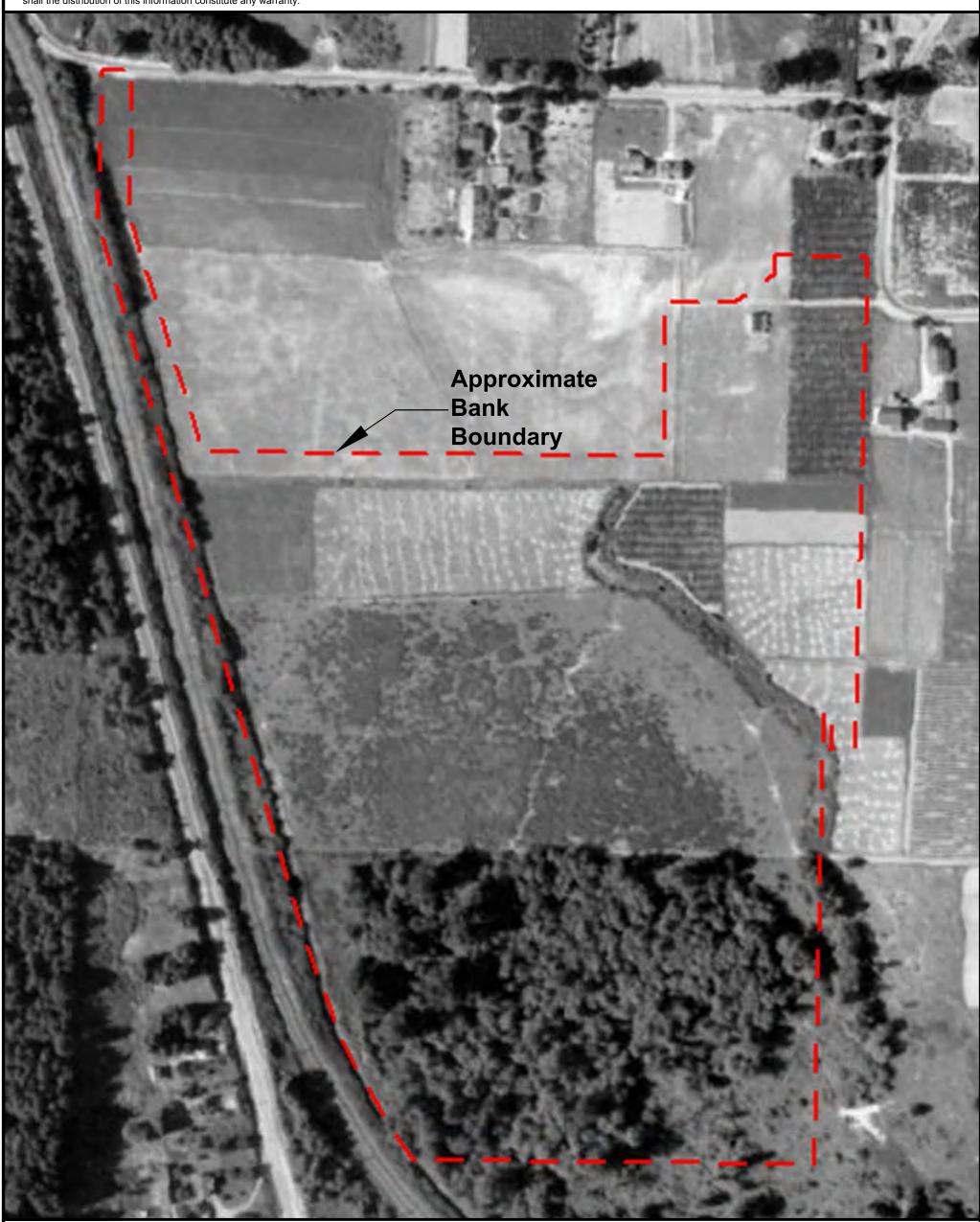
05/24/2017



Figure A9: 1940 Aerial Photograph

Note: The locations of all features shown are approximate. Historic aerial imagery was not modified to fit the project site precisely, therefore the project boundary may be shifted in relation to the background imagery. This Figure is for informational purposes only and is intended to assist in showing features discussed in the attached document. Neither the Port of Tacoma nor any of it's staff or consultants makes any warranty of any kind for this information, express or implied, including but not limited to to any warranties or merchantability or fitness for a particular purpose, nor shall the distribution of this information constitute any warranty.





Reference: Imagery shown is derived from aerial imagery found at GovMe website (www.govme.org).

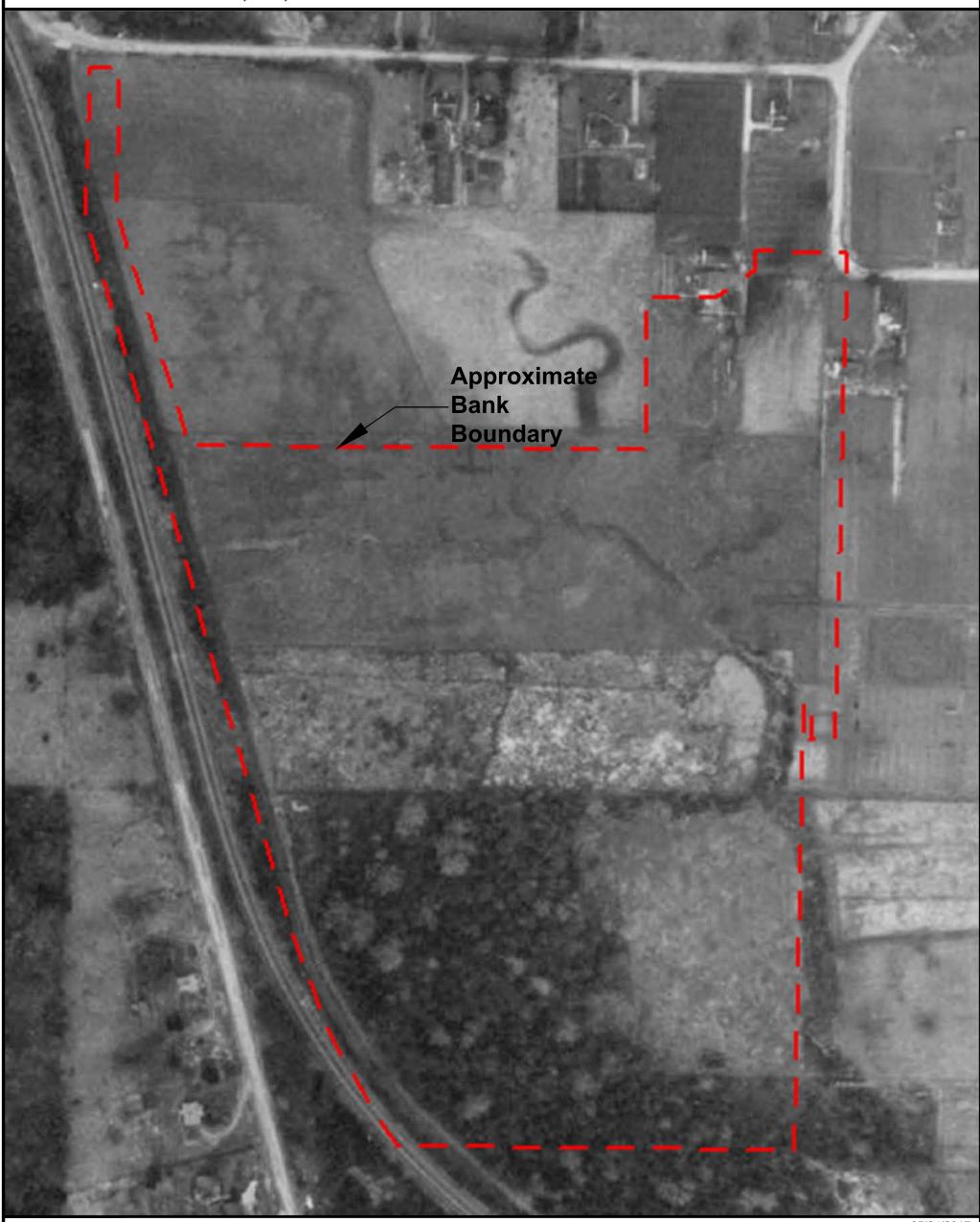
05/24/2017



Figure A10: 1950 Aerial Photograph

Note: The locations of all features shown are approximate. Historic aerial imagery was not modified to fit the project site precisely, therefore the project boundary may be shifted in relation to the background imagery. This Figure is for informational purposes only and is intended to assist in showing features discussed in the attached document. Neither the Port of Tacoma nor any of it's staff or consultants makes any warranty of any kind for this information, express or implied, including but not limited to to any warranties or merchantability or fitness for a particular purpose, nor shall the distribution of this information constitute any warranty.





Reference: Imagery shown is derived from aerial imagery found at GovMe website (www.govme.org).

05/24/2017



Figure A11: 1973 Aerial Photograph

Note: The locations of all features shown are approximate. Historic aerial imagery was not modified to fit the project site precisely, therefore the project boundary may be shifted in relation to the background imagery. This Figure is for informational purposes only and is intended to assist in showing features discussed in the attached document. Neither the Port of Tacoma nor any of it's staff or consultants makes any warranty of any kind for this information, express or implied, including but not limited to to any warranties or merchantability or fitness for a particular purpose, nor shall the distribution of this information constitute any warranty.





Reference: Imagery shown is derived from aerial imagery found at GovMe website (www.govme.org).



EXHIBIT A1Legal Descriptions

RECORD OF SURVEY

A PORTION OF THE NORTHEAST AND SOUTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 14, TOWNSHIP 20 NORTH, RANGE 3 EAST, W.M., PIERCE COUNTY, WASHINGTON

PROPERTY DESCRIPTION (PARCELS DEPICTED ON SHEET 2 ONLY)

PARCEL NO. 0320141001

(PER CHICAGO TITLE, COMMITMENT NO. 4163337, DATED JULY 31, 2000)

THE NORTH HALF OF THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 14, TOWNSHIP 20 NORTH, RANGE 3 EAST OF THE WILLAMETTE MERIDIAN.

EXCEPT THE NORTH 264 FEET OF THE EAST 160.5 FEET THEREOF. ALSO EXCEPT A TRACT DESCRIBED AS BEGINNING 310 FEET WEST OF THE NORTHEAST CORNER OF SAID SECTION; THENCE WEST 505 FEET; THENCE SOUTH 264 FEET; THENCE EAST 505 FEET: THENCE NORTH 264 FEET TO THE POINT OF BEGINNING. ALSO EXCEPT RIGHT OF WAY OF NORTHERN PACIFIC RAILWAY COMPANY. ALSO EXCEPT RIGHT OF WAY OF DRAINAGE DITCH, APPROPRIATED FOR DRAINAGE DISTRICT NO. 10 UNDER PIERCE COUNTY SUPERIOR COURT CAUSE NUMBER 33595.

ALSO EXCEPT PIONEER WAY. ALSO EXCEPT GAY ROAD PURSUANT TO INSTRUMENT RECORDED UNDER RECORDING NUMBER 368502

*ALSO EXCEPT GAY ROAD PER QUIT CLAIM DEED RECORDED UNDER PIERCE COUNTY AUDITOR'S FILE NO. 201401160327.

*TOGETHER WITH GAY ROAD PER QUIT CLAIM DEED RECORDED UNDER PIERCE COUNTY AUDITOR'S FILE NO. 201401160328.

ALL THAT PORTION OF THE SOUTH HALF OF THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 14, TOWNSHIP 20 NORTH, RANGE 3 EAST OF THE WILLAMETTE MERIDIAN, LYING EAST OF THE EAST LINE OF THE RIGHT OF WAY OF DRAINAGE DITCH APPROPRIATED FOR DRAINAGE DISTRICT NO. 10 UNDER PIERCE COUNTY SUPERIOR COURT CAUSE NUMBER 33595, RUNNING ALONG THE EAST SIDE OF THE NORTHERN PACIFIC RAILWAY COMPANY RIGHT OF WAY AND NORTH OF THE FOLLOWING LINE:

BEGINNING AT THE INTERSECTION OF THE SOUTH LINE OF THE NORTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 13, SAID TOWNSHIP AND RANGE, WITH THE WEST BOUNDARY OF GAY COUNTY ROAD; THENCE NORTH ALONG SAID WEST BOUNDARY OF ROAD, 200 FEET; THENCE WEST ON A LINE PARALLEL WITH THE SOUTH LINE OF SAID NORTHWEST QUARTER OF THE NORTHWEST QUARTER 680 FEET; THENCE NORTH 60 FEET; THENCE WEST TO THE EAST LINE OF SAID DRAINAGE DITCH.

SITUATE IN THE COUNTY OF PIERCE, STATE OF WASHINGTON.

(PER FIRST AMERICAN TITLE, COMMITMENT NO. NCS-515546-WA1, DATED NOVEMBER 16, 2011)

THAT PORTION OF THE NORTHEAST QUARTER OF SECTION 14, TOWNSHIP 20 NORTH, RANGE 3 EAST, W.M., PIERCE COUNTY, WASHINGTON DESCRIBED AS FOLLOWS:

COMMENCING AT THE INTERSECTION OF THE SOUTH LINE OF THE NORTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 13, TOWNSHIP 20 NORTH, RANGE 3 EAST, W.M., WITH THE WEST LINE OF GAY COUNTY ROAD; THENCE NORTH 87'40'01" WEST ALONG SAID SOUTH LINE OF SAID SUBDIVISION A DISTANCE OF 634.58 FEET TO THE NORTHEAST CORNER OF THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER OF SAID SECTION 14; THENCE NORTH 8815'38" WEST ALONG THE NORTH LINE OF SAID SUBDIVISION A DISTANCE OF 60.46 FEET TO THE TRUE POINT OF BEGINNING OF THIS DESCRIBED PARCEL; THENCE NORTH 02"4'42" EAST A DISTANCE OF 260.01 FEET; THENCE NORTH 88"15'37" WEST PARALLEL WITH THE NORTH LINE OF SAID SOUTHEAST QUARTER OF THE NORTHEAST QUARTER OF SAID SECTION 14 A DISTANCE OF 1,024.51 FEET TO THE EASTERLY LINE OF THE DRAINAGE DITCH OF DRAINAGE DITCH NO. 10; THENCE SOUTH 13'54'49" EAST ALONG SAID EASTERLY LINE OF SAID DRAINAGE DITCH A DISTANCE OF 306.29 FEET TO THE BEGINNING OF A CURVE TO THE LEFT, HAVING A RADIUS OF 1,340.00 FEET; THENCE SOUTHEASTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 23"12"56" AND ARC DISTANCE OF 542.95 FEET TO THE SOUTH LINE OF THE NORTH 514.30 FEET OF THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER OF SAID SECTION 14; THENCE SOUTH 8815'37" EAST ALONG SAID SOUTH LINE A DISTANCE OF 688.04 FEET, MORE OR LESS, TO THE WEST LINE OF PIERCE COUNTY TAX ACCOUNT NUMBER 0320132103; THENCE NORTH 02'04'42" EAST PARALLEL WITH THE EAST LINE OF SAID SOUTHEAST QUARTER OF THE NORTHEAST QUARTER OF SAID SECTION 14 A DISTANCE OF 514.30 FEET TOT HE TRUE POINT OF BEGINNING.

(NOTE: * = PORTION OF DESCRIPTION ADDED BY APEX ENGINEERING, JANUARY 2014)

BASIS OF BEARINGS

HELD NORTH 86'51'23" WEST FROM THE FOUND MONUMENT AT THE NORTHEAST CORNER OF SECTION 14 (WSDOT MON #5398) TO THE FOUND MONUMENT AT THE EAST 1/16 CORNER BETWEEN SECTIONS 11 & 14.

(AS DERIVED FROM GPS OBSERVATIONS, SEE HORIZONTAL DATUM NOTE)

METHODS AND EQUIPMENT

SURVEY PERFORMED WITH A 1" TOTAL STATION, USING TRAVERSE AND RADIAL SURVEY METHODS, AND SUPPLEMENTED USING A TOPCON HYPERLITE GPS RECEIVER UTILIZING RTK METHODS AND THE WASHINGTON STATE REFERENCE NETWORK. SURVEY MEETS OR EXCEEDS ACCURACY REQUIREMENTS CONTAINED IN W.A.C. 332.130.090.

REFERENCES

- NORTHERN PACIFIC RAILROAD RIGHT OF WAY MAP, LAST REVISION DATED APRIL 5, 1930; FOUND IN PIERCE COUNTY PUBLIC WORKS VAULT IN THE HANGING TRACINGS NO. 2-72. ANOTHER COPY FOUND IN THE TRACING BINS NO. 3/100.
- TRANSCRIPT OF FIELD NOTES FOR SURVEY OF ESTABLISHMENT FOR GAY ROAD, DATED JULY 17, 1905; FOUND IN ROAD FILES OF RECORDS OF PIERCE COUNTY PUBLIC WORKS.
- MAP OF SURVEY FOR GAY ROAD, DATED MARCH 15 AND APRIL 13-14, 1905; FOUND IN ROAD FILES OF RECORDS OF PIERCE COUNTY PUBLIC WORKS.
- ORDER OF ESTABLISHMENT FOR GAY COUNTY ROAD, DATED JULY 19. 1905.
- COMMISSIONERS RECORDS, PIERCE COUNTY PUBLIC WORKS. RECORD OF SURVEY, AUDITOR'S FILE NUMBER (AFN) 2224, BOOK 23, PAGE 23.
- PIERCE COUNTY SHORT PLAT 79-398.
- RECORD OF SURVEY, AFN 8302180250
- RECORD OF SURVEY, AFN 8601020643.
- PIERCE COUNTY SHORT PLAT, AFN 8812290473.
- PIERCE COUNTY SHORT PLAT, AFN 8907110290.
- RECORD OF SURVEY, AFN 9010090124.
- 12. RECORD OF SURVEY, AFN 9105240386.
- 13. RECORD OF SURVEY, AFN 9302160099.
- RECORD OF SURVEY, AFN 9501310537
- 15. RECORD OF SURVEY, AFN 9609110147. DECLARATION OF LOT COMBINATION UNDER AFN 200507250951.
- 17. RECORD OF SURVEY, AFN 200711025004.
- 18. RECORD OF SURVEY, AFN 200904135004. 19. PIERCE COUNTY SUPERIOR COURT CAUSE NO. 33595 FOR THE APPROPRIATION OF LAND
- FOR DRAINAGE DISTRICT NO. 10.
- 20. QUIT CLAIM DEED, AFN 201401160327 21. QUIT CLAIM DEED, AFN 201401160328
- 22. QUIT CLAIM DEED, AFN 201401160329.

BOUNDARY NOTES

THE NORTHERN PACIFIC RAILROAD RIGHT OF WAY (ROW) IS BASED ON THE NORTHERN PACIFIC RAILROAD RIGHT OF WAY MAP, LAST REVISION DATED APRIL 5, 1930 AND FOUND IN THE PIERCE COUNTY PUBLIC WORKS VAULT IN THE HANGING TRACINGS NO. 2-72. ANOTHER COPY CAN BE FOUND IN THE TRACING BINS NO. 3/100; BOTH DRAWINGS SHOW THE SAME INFORMATION. THE CENTER LINE OF THE ROW WAS CALCULATED BY HOLDING THE RECORD DIMENSIONS FROM SECTION CORNERS AS SHOWN ON SAID MAP. THE DISTANCE OF 176' NORTH FROM THE EAST QUARTER CORNER OF SECTION 14 TO CENTER LINE OF THE ROW WAS HELD, AS WAS THE DISTANCE OF 1198' EAST OF THE NORTH QUARTER CORNER OF SECTION 14. THE INTERSECTION OF THE CENTER LINE OF THE ROW AND THE EAST LINE OF SECTION 14 WAS HELD AS STATION 191+67 AND THE RECORD DATA WAS HELD FROM THIS POINT TO THE NORTH.

THE RIGHT OF WAY FOR DRAINAGE DISTRICT #10 IS BASED ON THE RECORD INFORMATION AS CONTAINED IN PIERCE COUNTY SUPERIOR COURT CAUSE #33595. THE ROW IS 40' WIDE THROUGH SECTION 14 AS PER SAID COURT CAUSE AND PARALLELS THE NORTHERN PACIFIC ROW. SOME RECORDED SURVEYS AND PIERCE COUNTY MAPS SHOW THE RIGHT OF WAY TO BE 30' WIDE, INCLUDING THE SURVEY R11. IT IS CLEAR WHEN READING THE COURT CAUSE THAT THIS RIGHT OF WAY WAS APPROPRIATED AT 40' WIDE. NO FURTHER ACTION SINCE THIS TIME HAS CHANGED THE WIDTH. IT IS SHOWN AS 40' MDE HEREON. A PORTION OF THE ACTUAL DRAINAGE DITCH ENCROACHES UPON SUBJECT PROPERTY AS SHOWN ON SHEET 2.

THE GAY ROAD RIGHT OF WAY WAS ESTABLISHED BY THE ORDER OF ESTABLISHMENT FOR GAY COUNTY ROAD, DATED JULY 19, 1905, SHOWN ON THE MAP OF SURVEY FOR GAY ROAD, DATED MARCH 15 AND APRIL 13-14, 1905, AND SURVEYED BY THE FIELD NOTES FOR SURVEY OF ESTABLISHMENT FOR GAY ROAD, DATED JULY 17, 1905. THESE DOCUMENTS CLEARLY SHOW AND STATE THAT THE RIGHT OF WAY JOGS SOUTH OF THE SECTION LINE AS SHOWN BY EXHIBIT "A" HEREON. THE DOCUMENTS ALSO ESTABLISHED THE RIGHT OF WAY TO THE EAST OF THIS JOG AS 25' NORTH OF THE SECTION LINE AND 15' SOUTH OF THE SECTION LINE. THIS IS HOW THE RIGHT OF WAY IS REPRESENTED HEREON. PORTIONS OF THE EXISTING COUNTY MAINTAINED ASPHALT ROADWAY DO NOT LIE IN THE ESTABLISHED RIGHT OF WAY AND ENCROACH UPON THE ADJOINING PROPERTIES.

AS PART OF THIS PROJECT THE PORT OF TACOMA, PIERCE COUNTY, AND THE OWNERS OF THE MOBILE HOME PARK (PROPERTY NORTH OF GAY ROAD) AGREED TO SWAP LAND TO ENSURE THE EXISTING ROADWAY LIES WITHIN DEEDED ROW. DOCUMENTS WERE RECORDED AND OWNERSHIP WAS TRANSFERRED AS SHOWN IN DETAIL "A" BELOW.

SURVEYOR'S NOTES

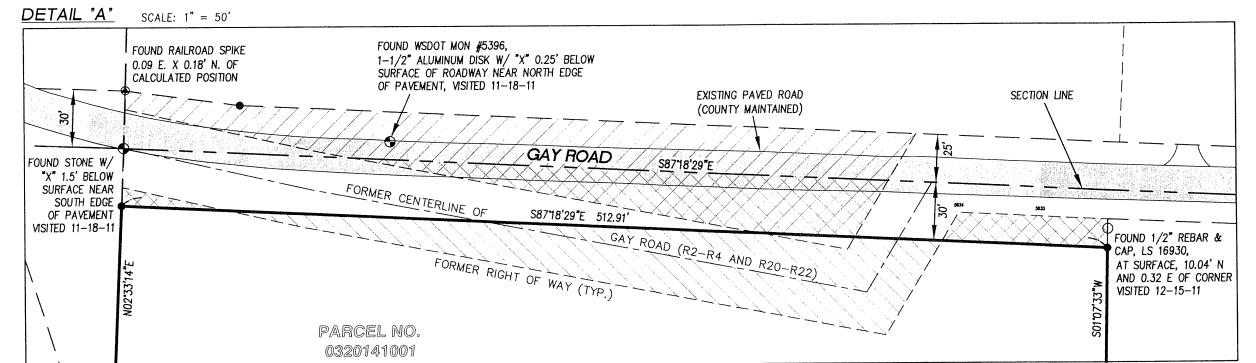
- 1. DATA FOR THIS SURVEY WAS GATHERED BY FIELD TRAVERSE UTILIZING ELECTRONIC DATA COLLECTION ON 10-21-11 THROUGH 04-03-12.
- THIS SURVEY DOES NOT PURPORT TO SHOW ANY OR ALL EASEMENTS ENCUMBERING THIS SITE. YOUR TITLE INSURANCE POLICY IS A RESOURCE TO CONSULT FOR INFORMATION REGARDING EASEMENTS WHICH MAY AFFECT YOUR PROPERTY.
- THIS SURVEY WAS PREPARED FOR THE EXCLUSIVE USE OF THE PORT OF TACOMA AND DOES NOT EXTEND TO ANY UNNAMED PERSON OR PERSONS WITHOUT EXPRESS CERTIFICATION BY SURVEYOR NAMING SAID PARTY.
- 4. ALL DISTANCES SHOWN ARE GROUND VALUES.
- 5. THE PURPOSE OF THIS SURVEY IS TO DEPICT THE CURRENT RIGHT OF WAY OF GAY ROAD ADJACENT TO THE NORTH LINE OF THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 14; TO DEPICT FOUND AND SET MONUMENTS AS PROPERTY CORNERS OF SUBJECT PROPERTY AND A PORTION OF THE NORTH MARGIN OF SAID GAY ROAD.

SURVEY HISTORY

THIS PROPERTY IS LOCATED IN SECTION 14, TOWNSHIP 20 NORTH, RANGE 3 EAST, W.M., PIERCE COUNTY, WASHINGTON. IT IS ALSO LOCATED WITHIN THE HISTORIC PUYALLUP INDIAN RESERVATION. IT WAS ORIGINALLY SURVEYED IN 1873 UNDER CONTRACT NO. 36 BY MCCARTNEY AND LINDSLEY USING THE THREE MILE METHOD WHICH WAS TYPICAL FOR INDIAN LANDS.

IN 1911, THE COUNTY STARTED SURVEYING ALONG THE PUYALLUP RIVER UNDER THE INTRA-COUNTY RIVER IMPROVEMENT PROJECT (ICRI). GLO CORNERS IN THIS SECTION WERE RECOVERED OR REESTABLISHED BY THE COUNTY AND RECORDED IN COUNTY FILED BOOKS.

IN 1931, DH WHITE, PIERCE COUNTY ENGINEER, SURVEYED IN THIS AREA AND RECOVERED OR REESTABLISHED LOST AND OBLITERATED CORNERS. ALL SECTION CORNERS AND 1/16 CORNERS TIED BY APEX FOR THIS SURVEY ARE EITHER ORIGINAL MONUMENTS OR THOSE REESTABLISHED BY DH WHITE, WITH THE EXCEPTION OF NE CORNER OF THE SE 1/4 OF THE NE 1/4 OF SECTION 14. APEX FOUND A REBAR & CAP MONUMENT AT SAID CORNER POSITION AS SET BY CHARLES HAVILAND IN A 1990 SURVEY (R11). THE POSITION OF SAID REBAR WAS BASED ON THE CALCULATED POSITION OF A MONUMENT, CALLED OUT AS A CONCRETE SLAB WITH "X", FOUND BY ARNE RIIPINEN IN 1978 SURVEY R5. RIIPINEN NOTES THAT THE LOCATION OF THE CONCRETE SLAB WITH "X" MATCHES TO A STONE MONUMENT FOUND BY PIERCE COUNTY IN 1911 AND NOTED IN FIELD BOOK 184, PG. 43. SAID CONCRETE SLAB WAS FOUND AND NOTED ON SURVEYS R5 (1978), R6 (1979), AND R10 (1989). EACH OF THESE SURVEYS SHOWS TIES FROM SAID SLAB TO THE MONUMENT (1" IRON PIPE) AT THE SE CORNER OF SW 1/4, NW 1/4, NW 1/4 OF SECTION 13. THE REBAR AS SET BY HAVILAND (R11) AND FOUND BY APEX MATCHES VERY CLOSELY TO TIES AS NOTED ON THE SURVEYS ABOVE. DH WHITE ALSO NOTES A TIE BETWEEN THE TWO MONUMENTS OF 655'. WHILE SAID REBAR & CAP IS NOT AN ORIGINAL MONUMENT, APEX IS HOLDING THE LOCATION OF THE REBAR & CAP MONUMENT AS THE BEST EVIDENCE OF THE ORIGINAL CORNER POSITION AND A PERPETUATION THEREOF DUE TO THE CONFORMITY WITH SURVEYS OF RECORD AND PIERCE COUNTY DATA.



LEGEND

FOUND MONUMENT AS NOTED

FOUND REBAR & CAP AS NOTED

FOUND RAILROAD SPIKE AS NOTED

• SET REBAR AND CAP, PLS #34130/18902

(Rx) REFERENCE NUMBER (SEE LIST) PIERCE COUNTY ACQUISITION PER QUIT CLAIM DEED,

AFN 201401160327 (R20) PORT OF TACOMA ACQUISITION PER QUIT CLAIM DEED, AFN 201401160328 (R21)

PIERCE COUNTY ACQUISITION PER QUIT CLAIM DEED, AFN 201401160329 (R22)

SHEET 1 OF 2

JOB NO. 32207

AUDITOR'S CERTIFICATE

FILED FOR RECORD THIS 18th DAY OF JULY AT 23 MINUTES PAST 1:00 P. M. N. # 138.05 RECORDS OF THE PIERCE COUNTY AUDITOR, TACOMA, WASHINGTON.
RECORDING NUMBER 201407185001. FE

PIERCE COUNTY AUDITOR

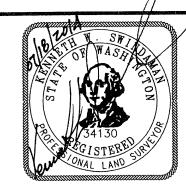
AUDITOR'S INDEXING DATA

SURVEY IN:

NE 1/4 OF NE 1/4 OF SEC. 14, T20N, R3E EW 1/4 OF NE 1/4 OF SEC. 14, T20N, R3E SURVEYOR'S CERTIFICATE

THIS MAP CORRECTLY REPRESENTS A SURVEY MADE BY ME OR UNDER MY DIRECTION IN CONFORMANCE WITH THE REQUIREMENTS OF THE SURVEY RECORDING ACT AT THE REQUEST OF PORT OF TACOMA, IN JANUARY 2014.

07/18/2014



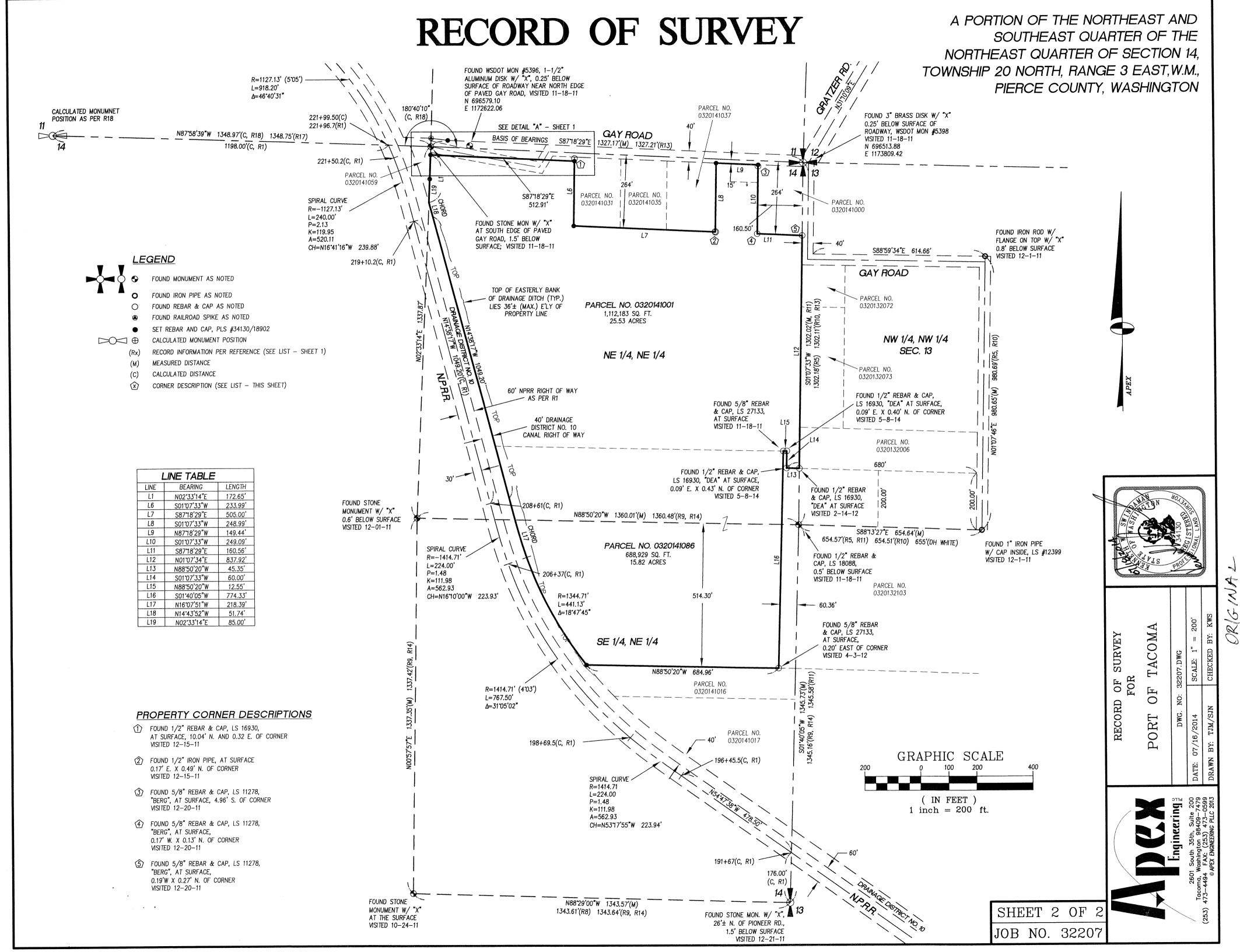
RECORD OF SURVEY FOR

PORT OF TACOMA

DWG. NO: 32207.DWG DETAIL SCALE: 1" = 50DATE: 07/16/2014 CHECKED BY: KWS DRAWN BY: TJM/SJN

Langineering Tacoma, Washington 98409-7479 (253) 473-4494 FAX: (253) 473-0599

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APPENDIX B Bank Development Plan and Design

Appendix B. Bank Development Plan and Design

Appendix B describes the Bank development plan and design. As mentioned in Appendix A, construction of many of the physical features of the 28.64-acre Bank site occurred in conjunction with construction of the 12.59-acre EPA site, between July 2014 and August 2016, although Bank establishment activities remain to be conducted or continued as of the time of execution of this Instrument. Construction activities that have already been completed per the development plan and design, but which represent ecological lift as compared with the pre-compensatory mitigation site conditions as described in Appendix A3.2, are referenced in past tense throughout these appendices.

B1.0 DEVELOPMENT PLAN - OVERVIEW

The goals of the Bank are to restore hydrology, floodplain connectivity, and aquatic resource habitat for anadromous fish and aquatic-dependent avian and wildlife species. Long-term alterations and disturbances associated with past agricultural uses have been removed from the Bank and Clear Creek has been reconnected with restored floodplain wetlands. A side-cast berm levee, drainage ditch and multiple drain tiles were removed from the banks of Clear Creek and the surrounding wetland to improve hydrologic conditions. Reed canarygrass (including rhizomes) was removed from the emergent (abandoned agricultural field) portions of the wetland to reduce competition while installed native vegetation becomes established. Additional restoration actions included creating off-channel habitat, installing large woody material (LWM) structures in the realigned floodplain channels, and restoring floodplain wetlands and other habitat features to further enhance the functions of the Bank and accomplish the goals of the Bank.

The Bank will re-establish and rehabilitate floodplain wetland habitat, create and enhance fish habitat and forested uplands. The project will re-establish riverine forested and scrub-shrub floodplain wetland habitat through the removal of historic fill and the installation of a diverse assemblage of native trees, shrubs, and emergent species. Degraded depressional forested, scrub-shrub, and emergent wetlands will be rehabilitated by removing past alterations, including removing the side-cast berm levee, realigning Clear Creek through the wetland floodplain, and grading the wetlands to restore hydrologic interactions with Clear Creek and reduce the potential for fish stranding.

The Bank habitat restoration project includes several floodplain channels, a portion of the main channel, and two Palustrine Aquatic Bed (PAB) ponds with outlet channels that connect to the Environmental Protection Agency (EPA) site channels (Figure B1). The network of multiple channels is intended to maximize fish habitat on the site, provide habitat complexity during varying flow levels, and mimic conditions historically found in the watershed. The alignments of the channels contain meanders that resemble naturally occurring streams, which also function to provide additional channel length and habitat area for fish. Figure B2 show the restoration features and post-restoration plant communities. Figure B3 identifies the fish conservation actions used in the Habitat Equivalency Analysis (HEA). Figure B4 shows an overview of the clearing and grading that were conducted at the site and Exhibit B1 contains detailed grading sheets. Exhibit B2 contains restoration feature location sheets and Exhibit B3 includes typical details of restoration elements.

B2.0 SUMMARY OF DESIGN ELEMENTS

The Bank project will rehabilitate 22.05 acres of degraded wetlands and anadromous fish habitat, re-establish 4.18 acres of floodplain wetland, enhance 1.61 acres of degraded uplands, and preserve 0.8 acres of Clear Creek (See Figure B1 and Table B1). The project was designed to increase floodplain, riparian, wetland, and fish habitat functions and complexity through removal of historic anthropogenic disturbances, implementation of multiple design features and establishment of diverse plant communities. The design features include floodplain channels and shallow channel benches, side channels, forested, scrub-shrub and emergent floodplain wetland plant communities, forested uplands, floodplain PAB ponds, hummocks (i.e., mounds), and LWM structures and are described in the following sections.

TABLE B1. PROPOSED COWARDIN HABITAT TYPES AND ACREAGES¹

Activity by Area and Cowardin Class	Creditable Acres	Non- Creditable Acres	Total Acres
Wetland Re-establishment: PFO Mosaic ²	3.06	0.87	3.93
Wetland Re-establishment: PSS Mosaic ²	0.06	0.07	0.13
Wetland Re-establishment: PEM Mosaic ²	0.01	0.01	0.02
Re-establishment: Bank Channels and Alcoves	0.00	0.10	0.10
Re-establishment Sub-total:	3.13	1.05	4.18
Wetland Rehabilitation: PFO Mosaic ²	1.05	0.71	1.76
Wetland Rehabilitation: Existing PFO	7.17	1.11	8.28
Wetland Rehabilitation: Existing PFO w/ Voluntary Understory Plantings	1.74	0.35	2.09
Wetland Rehabilitation: PSS Mosaic ²	6.19	0.48	6.67
Wetland Rehabilitation: PEM Mosaic ²	1.78	0.13	1.91
Rehabilitation: PAB Ponds	0.76	0.12	0.88
Rehabilitation: Bank Channels	0.38	0.08	0.46
Rehabilitation Sub-total:	19.07	2.98	22.05
Forested Upland Enhancement: UPL	0.13	1.48	1.61
Preservation: Baseline Clear Creek	0.00	0.80	0.80
TOTALS:	22.33	6.31	28.64

Notes:

B2.1 Grading

B2.1.1 Site Clearing and Grubbing

The project requires removal of vegetation (grubbing) and other materials (e.g., downed wood) from within grading, temporary access, and staging areas. Project-related clearing and grubbing was conducted with

¹⁾ Minor variations in acreages shown on this table are due to rounding acreages after splitting creditable and non-creditable acreages.

²⁾ Mosaic areas include forested hummocks.

typical heavy construction equipment including dump trucks, bulldozers, loaders, excavators, and backhoes. Most of the clearing and grubbing involved stripping surface soils containing reed canarygrass matter. Clearing and grubbing of native emergent, shrub, and tree vegetation was only conducted where necessary along alignments of the floodplain channels through the existing forested wetland. Clearing and grubbing also included removing patches of Himalayan blackberry.

B2.1.2 Site Excavation and Grading

Excavation was conducted at the Bank to restore floodplain connection and re-establish floodplain channels, floodplain wetlands, and other aquatic resources and fish habitat. The project involves lowering portions of the floodplain to achieve two primary goals: 1) rehabilitate and re-establish floodplain wetlands to achieve frequent inundation of the floodplain wetlands for off-channel salmonid habitat; and 2) manage areas where invasive reed canarygrass (*Phalaris arundinacea*) has colonized extensively. Lowering the ground surface required removal of soil containing the root mass and seed bank of reed canarygrass. The removed soil was disposed offsite. The ideal depth for removal of the bulk mass of roots was 18 inches. The ground surface used for modeling assumed the removal of 18 inches wherever possible, such as along the constructed floodplain channels, adjacent low elevation bench habitats, PAB ponds, and areas previously not inundated for most of the year based on well data. In other areas where reed canarygrass was present, the upper approximately 12 inches of soil was removed.

Where existing native shrubs and trees were preserved, no excavation or grading occurred. Large quantities of historic fill material were removed and some excavation of underlying native soil was necessary in support of re-establishing stream channels and creating PAB ponds. Excavation and grading activities required heavy machinery such as dump trucks, bulldozers, loaders, excavators, and backhoes. A plug of fill was retained at the connection between Clear Creek and the Bank until all site preparation and stabilization activities were completed within the floodplain portion of the site. This protected Clear Creek from accidental releases of sediment during site excavation and grading.

Areas primarily affected by earthwork-related construction activities at the Bank included upland pasture, an upland side-cast berm levee adjacent to Clear Creek, and degraded wetland dominated by reed canarygrass. Clearing and grubbing included all planting areas other than understory plantings and all channel, PAB pond, and alcove areas. Table B2 presents information on clearing and grubbing, excavation, and fill.

TABLE B2. PROJECT CLEARING AND GRADING VOLUMES

Affected Area Type	Approximate Area or Volume	Description
Clearing and Grubbing	18 acres	All areas where excavation and grading occurred were completely cleared and grubbed of vegetation, which primarily affected upland pasture and emergent wetland habitat dominated by reed canarygrass but also included small areas of forested wetland habitat to accommodate new floodplain channels.
Excavation (Cut)	30,000 cubic yards	Excavation was required to re-establish new floodplain channels and floodplain elevations.
Fill	5,300 cubic yards soil; 375 cubic yards imported rock; 750 cubic yards cobble	Excavated material was used to create hummocks within the site. Imported rock was required to realign the channel and build channel deflector and pool forming cobble structures.

Establishment of final grades on the Bank was based on hydrologic and topographic assessments to re-establish more natural floodplain channel configurations, flow patterns and floodplain interactions. Groundwater is present year-round at shallow depths beneath the ground surface at the Bank. Hydrologic and hydraulic analyses were conducted for the site and groundwater was monitored with pressure transducers at eight wells starting in November 2011 (Herrera 2012, 2013a). Groundwater elevations range from minimum elevations in summer (average 1.25 feet below soil surface) to maximum elevations in the winter (average 1 foot of inundation above soil surface) with an overall average median of groundwater 0.1 feet below the soil surface (averaged across all wells over entire monitoring period). Overall groundwater elevations are elevated from March through May and then gradually trend downward with persistent dry weather during summer months. Groundwater levels appear to be strongly correlated to precipitation events, and also show a response to fluctuations when the Puyallup River is at high stages. The ground elevation and summary statistic for groundwater/surface ponding is shown on Table B3 and Figure B5.

TABLE B3. GROUND ELEVATION AND SUMMARY STATISTICS FOR GROUNDWATER/SURFACE PONDING ELEVATION DATA MEASURED AT THE UCCMS FROM NOVEMBER 30, 2011, THROUGH JANUARY 10, 2013 (HERRERA, 2013A).

		Groundwater / Surface Ponding Elevation				
Station	Ground Elevation (feet)	Minimum (feet)	Median (feet)	Maximum (feet)		
MW-1	13.53	12.01	13.90	15.00		
MW-2	13.57	13.29	14.55	15.66		
MW-3	14.96	12.70	14.38	16.09		
MW-4	13.22	11.26	13.49	14.79		
MW-5	13.42	13.27	14.49	15.79		
MW-6	14.27	12.16	13.75	14.77		
MW-7	14.92	11.97	12.54	14.34		
MW-8	13.65	12.18	13.65	14.91		

Note:

All elevations referenced to POT MLLW datum.

After soils were excavated and the floodplain, channels, and PAB ponds were graded, hummocks were installed to achieve topographic variation and increase habitat interspersion. Soil excavated from the site that did not contain reed canarygrass (shoots, roots, seed) was used to create hummocks, enabling greater diversity in riparian and floodplain wetland plant communities by creating topographic relief in the wetland areas, and to maximize fish and wildlife habitat value of the completed project. To divert flows into the floodplain channels, excavated soil, imported rock, and LWM were used to create deflector structures at two locations within Clear Creek (Figure B2).

B2.2 Floodplain Channel and Bench Design

The overall Upper Clear Creek Mitigation Site (UCCMS) includes the Bank site and adjacent EPA site. The overall UCCMS design includes construction of several floodplain channels: a main channel, a short segment of side channel off the main channel, a secondary overflow channel, and two PAB pond outlet channels. The network of multiple floodplain channels is intended to maximize fish habitat potential on the overall UCCMS site, provide habitat complexity, and mimic historic conditions. 3,400 linear feet of floodplain channels are part of the EPA site and are not included in the Bank acreage calculations (Figure B1). However, the design elements of these features are described briefly in this Appendix to capture the synergistic habitat improvements of the Bank and EPA site.

The floodplain channels contain meanders that resemble naturally occurring stream morphology and function to provide additional channel length and fish habitat. The alignment of the southeastern PAB pond outlet channel and the main channel generally resemble the inferred historic channel alignment based on historic aerial photograph (Figure B6) analysis presented in the *Revised Wetland Delineation and Analysis Report – Upper Clear Creek Mitigation Site* (Grette Associates 2012). However, the alignment of the southeastern PAB outlet channel has been adjusted to provide buffer area between the stream channel and surrounding properties. The main channel inlet location (i.e., deflection point from Clear Creek) was driven largely by the southern property boundary. Channel alignments through existing forested wetland were chosen based on naturally occurring depressions and avoidance of existing trees. The alignment of the secondary overflow channel was chosen to avoid impact to existing forested wetlands and to improve riverine floodplain wetland functions.

Hydraulic modeling was conducted to determine the optimal dimensions of the floodplain channels and adjacent bench habitats as documented in the *Hydrologic and Hydraulic Analysis – Upper Clear Creek Habitat Site* (Herrera 2012). During modeling of various channel dimensions, channel widths were modified to provide more flow depth complexity including a deeper main channel and shallower floodplain bench habitat with diverse inundation levels at various seasonal base flow rates. The width of the floodplain channels range between approximately 8 and 10 feet to maintain sediment conveyance and sustain channel geometries with flow depths of approximately 1 to 2.5 feet deep under low-flow conditions. The benches are approximately 0.5-foot lower in elevation than the surrounding floodplain wetland grades with the intent of becoming inundated during the average annual flow rate. The widths and locations of the shallower benches are varied through the site with maximum widths ranging between 10 and 50 feet. On average, maximum bench width is approximately 20 feet.

The channel dimensions were designed to maintain flow velocities of 0.5 to 1.0 feet per second and shear stress of 0.03 to 0.1 pounds per square foot. The desirable flow velocity and shear stress ranges were carefully considered to provide an initial channel geometry that is relatively stable. The intent of the project is not to establish a reinforced or permanent channel, but rather to provide a relatively stable geometry

over the short-term to medium-term to allow the floodplain vegetation to establish, and allow the floodplain to morph naturally over time at the project site. With expansion of Clear Creek into the floodplain, it is inevitable that the channel will lengthen and the gradient will be reduced.

B2.3 Alcove Design

Alcoves were constructed within the Bank along the right bank of Clear Creek to add diversity to the channel habitat and provide low-energy refuge and rearing habitat for fish during high-flow periods (Figure B2). The alcoves are located adjacent to relatively straight segments of Clear Creek and resemble an enlargement of the channel. Mid-channel and bank roughening LWM structures were constructed adjacent to alcoves which will function to help prevent the alcoves from silting in. The depth and side slopes of the alcoves are similar to the Clear Creek channel.

B2.4 Channel Flow Diversions and Habitat Enhancement

Two LWM channel deflector structures were installed within the Bank in Clear Creek. These structures will function as partial flow blockages that divert approximately 80 percent of base flow into the new main channel while maintaining some flow in Clear Creek. The structures are designed to provide robust flow splitting that mimics a stable beaver dam complex. These two structures were each designed as a complex "jumble" of logs that will create a rough flow path at low flow, but less impedance of flow for higher events, thereby optimizing the flood conveyance capacity through Clear Creek, constructed floodplain channels, and adjacent floodplain area. The second deflector structure is positioned to deflect as much flow into the floodplain as possible while also maintaining some flow in Clear Creek.

Several habitat improvements conducted along the right bank of Clear Creek include:

- Removal of the side-cast berm levee
- Construction of nine alcoves of varying dimensions that mimic a more naturally meandering bank
- Installation of 12 LWM bank roughening structures and two channel roughening structures
- Revegetation of the right bank with a diverse assemblage of native emergent, shrub, and tree species

B2.5 Large Wood Material (LWM) Structures

Numerous LWM structures were installed across the site including in-channel and floodplain structures as shown on Figure B2 and in Exhibits B2 and B3. In-channel deflector structures were installed in Clear Creek to divert flows into the new floodplain channels, and instream meander roughening structures, channel roughening structures, and bank roughening structures were installed in Clear Creek and the floodplain channels to provide habitat complexity. Each of these structures contains rootwads within the channel exposed to flow. Over time, scour around these structures is anticipated to form pools thereby enhancing instream rearing and refuge habitat for fish species including juvenile and adult anadromous fish. The design profile of the main channel was modified to improve hydraulic complexity and provide variability in the flow depths by installing LWM pool forming cobble structures (i.e., high spots) to the base of the channel. These structures also support flooding within adjacent floodplain wetlands.

LWM structures within the floodplain include wetland roughening structures and hummock roughening structures. These structures provide floodplain roughening to increase hydraulic residence and support hydraulic complexity and the natural formation of topographic complexity. In addition, standing snags were

installed throughout the floodplain wetland areas on the Bank to provide enhanced habitat for aquatic dependent avian species.

Approximately 33 LWM structures were installed within the Bank in Clear Creek, floodplain channels, and PAB ponds. These structures consist of completely and partially embedded logs (with and without rootwads attached). In addition, approximately 72 LWM structures were installed within the Bank in hummocks and on the floodplain wetland. All structures were anchored by partially embedding logs to prevent them from becoming dislodged during flooding events. Approximately 13 tree snag structures with limbs attached were installed within the Bank. Habitat structures were installed with an excavator. The majority of logs used to construct LWM structures were imported; however, numerous large pieces of naturally occurring buried wood and live trees removed to accommodate construction were also used in the construction of LWM structures or placed as downed wood. Typical details for LWM structures are contained in Exhibit B3.

B2.6 Constructed Floodplain PAB Ponds

The profile of floodplain channels was designed to improve hydraulic complexity and provide variability in the flow depths. Two PAB ponds, considered PAB under Cowardin classification, were also constructed to provide additional variability in hydraulic depth and floodplain wetland habitat complexity (e.g., anadromous fish and aquatic dependent avian habitat) given the shallow nature of the floodplain and channels. The PAB ponds are anticipated to collect surface water during large flood events and colonize with native aquatic bed vegetation over time. Each PAB pond has an outlet channel (PAB pond outlet channel) that connects to downstream active flow channels (main channel or secondary overflow channel). The PAP pond outlet channels will prevent fish stranding during periods of low flow and provide access to the PAB ponds for fish rearing.

The PAB ponds were designed to mimic oxbow lakes, which were common on the historic Puyallup River floodplain. Three types of oxbow lakes were likely to have historically occurred in the vicinity of the Bank: very small ponds due to historic Clear Creek channels, medium sized ponds due to Puyallup River side channel signatures, or larger ponds due to main channel Puyallup River signatures. There are very few analogs of oxbow lakes in the surrounding project area due to the highly disturbed (agriculture and urbanization) condition of the floodplain. However, three highly disturbed oxbow lake signatures were observed on the left bank Puyallup River floodplain:

- 1. Clear Creek basin west of Chief Leschi High School property (west of 48th Street East ROW) approximately 1.2 miles southeast of the site. The signature includes a right and left bank meander on either side of the railroad tracks. Pioneer Way and the tracks have disturbed and masked the radius of the pond, which was estimated at approximately 150 feet. The width ranges from 60 to 80 feet and the length is about 350 feet. Vegetation was visible in recent aerial photography of this oxbow feature, consistent with PAB pond habitat. Given the size and radius, it is likely a Puyallup River side channel imprint.
- 2. Clarks Creek basin approximately 3.3 miles southeast of the site near the Washington State University Puyallup Research and Extension Center at the intersection of Pioneer Way E. and Fruitdale Avenue E. The oxbow lake imprint is large and a radius is not distinguishable. This pond is likely a main channel Puyallup River imprint with approximate dimensions of 900 feet long by 150 feet wide.
- 3. Clarks Creek basin approximately 3.8 miles southeast of the site near De Coursey Park (7th Avenue SW and 18th Street SW). Approximate dimensions are 700 feet long by 70 feet wide.

A large oxbow lake comparable to a main stem Puyallup River imprint such as the second oxbow example described above would not be appropriate given the size of the project site. A smaller oxbow lake is more appropriate for the site similar to the first oxbow imprint (Puyallup River side channel imprint) described above. The PAB pond shapes designed for the project site are variable in form; characteristic of the oxbow examples presented. The design dimensions of the PAB ponds include a maximum bottom width of approximately 50 to 65 feet, depth of approximately 3 to 4 feet, which will facilitate native vegetation establishment over time, radius of 120 to 150 feet, and a length of approximately 200 to 300 feet. The outer dimensions are also based on how the PAB ponds fit in the context of the site and surrounding hummocks, channels, and existing native vegetation to be preserved.

B2.7 Hummocks Design

The hummock design for the site was developed relative to the quantity of conifer trees that each hummock can support. The design includes two hummock shapes (round and oblong) of three different sizes (small, medium and large). The hummocks support varying quantities of conifer trees based on the size of the hummock, assuming trees are spaced 10 to 12 feet on-center (Table B4). The design also assumes no conifers would be planted on the lower elevations in the outer 10 feet of each hummock, as this zone could be too wet for conifers.

TABLE B4. HUMMOCK DESIGN DETAILS

Hummock Type	Quantity	Outer Dimension (approximate)	Outer Area (approximate)	Inner Dimension (approximate)	Inner Area for Conifer Tree Planting (approximate)	Number of Conifer Trees (10-12 feet on center)
Small- oblong	9	35 ft x 50 ft	1,288 SF	15 ft x 30 ft	285 SF	3
Medium- round	12	42 ft diameter	1,700 SF	23 ft diameter	500 SF	6
Medium- oblong	5	58 ft x 36 ft	1,700 SF	36 ft x 16 ft	500 SF	6
Large- round	1	55 ft diameter	2,500 SF	34 ft diameter	1,000 SF	12
Large- oblong	5	78 ft x 40 ft	2,500 SF	55 ft x 20 ft	1,000 SF	12

The hummocks were also sized to adequately anchor LWM structures. The LWM structures face toward the direction of anticipated flood flows to minimize erosion of the hummocks during high flows. In addition, oblong shaped hummocks are typically orientated parallel to the direction of stream flow. Over time, natural channel migration and erosion processes are anticipated to change the dimensions and alignment of the hummocks. However, to allow for establishment of diverse native vegetation communities and instream habitat, some of the hummocks are strategically positioned along the channels and within the floodplain to minimize short-circuiting of channel length due to avulsion.

The hummocks are designed at a height of 2.5 feet above the surrounding wetland floodplain elevations. Each hummock has 3:1 (horizontal:vertical) side slopes up to a height of 2 feet. The tops of the hummocks

are gently sloped and crowned to a maximum height of 2.5 feet. The height of the hummocks were designed to prevent flooding during the 6-month recurrence flow.

One very important aspect to the design of the floodplain wetland ecosystem at the Bank, is integration of the hummocks into the overall wetland restoration concept at the site. Hummocks, such as those designed for this site, play an important role in natural floodplain wetlands throughout the Puget Sound Lowlands by providing habitat complexity. The varied elevation ranges created by the hummocks provide habitat for different species of fauna, from macroinvertebrates to birds and small mammals. In addition, the elevation differences create a range of hydrologic conditions across the hummock, providing for a diverse range of vegetation. Hummock functions are an important component of the overall function of the floodplain wetland ecosystem and is an integral part of the wetland mosaic system.

B2.8 Summary of Vegetation and Habitat Communities

The primary baseline vegetation community at the Bank is dominated by a near monoculture of invasive vegetation. The mitigation actions at the site include management of invasive vegetation, and installation of a diverse assemblage of native vegetation communities as shown below in Table B5. Baseline Cowardin vegetation communities are shown in Appendix A on Figure A3 and post-construction vegetation communities are shown on Figure B2.

TABLE B5. BASELINE AND POST-CONSTRUCTION VEGETATION COMMUNITIES

		Post-Construction Vegetation Community (Acres)									
Baseline Vegetation Community	Forested UPL	PF0 Mosaic	Existing PF0	Existing PFO w/ Voluntary Understory Plantings	PSS Mosaic	PEM Mosaic	New Bank Channels (including alcoves)	PAB Ponds	Baseline Clear Creek Channel	Forest Hummocks	Total Acres
UPL Herbaceous / Developed	1.61	3.48	0	0	0.13	0.02	0.17	0	0	0.38	5.79
PEM	0	1.52	0	0.17	5.66	1.75	0.33	0.879	0	1.18	11.49
PSS	0	0	0.04	0	0	0	0	0	0	0	0.04
PFO	0	0.01	8.23	1.92	0.13	0.17	0.06	0.002	0	0	10.52
Clear Creek	0	0	0	0	0	0	0	0	0.80	0	0.80
TOTALS:	1.61	5.01	8.27	2.09	5.92	1.94	0.56	0.88	0.80	1.56	28.64

B2.8.1 Reed Canary Grass Removal from Wetland Floodplain

Extensive portions of the baseline wetland floodplain are dominated by invasive reed canarygrass. Within these areas, the primary method of eradication involved lowering the ground surface to remove soil containing the bulk root mass of reed canarygrass. The removed soil containing reed canarygrass roots was disposed offsite. The ideal depth for removal of the bulk mass of roots was 18 inches. However, in some areas, a depth of 12 inches was removed, which was determined based on hydraulic modeling analyses to maintain higher elevation wetland zones that will not be inundated year-round. Excavation to a depth of 18 inches in all areas dominated by reed canarygrass would have resulted in excessive flooding conditions during high base flow events and reduced variability of flooding conditions across the site which would have limited the sites ability to support diverse wetland vegetation communities. However, removal of 18 inches was conducted wherever possible; such as along the floodplain channels, adjacent lower elevation bench habitats, PAB ponds, and baseline areas not inundated for most of the year based on well data.

In addition to removal of soils containing reed canarygrass roots, these areas will be densely planted with a diverse assemblage of native trees, shrubs and emergent species. Post construction monitoring will be conducted and additional measures may be implemented, as needed, to manage reed canarygrass after construction including mowing and/or spot herbicide applications.

B2.8.2 Floodplain Wetland Vegetation Communities

The intent of the planting plan is to establish a diverse assemblage of native vegetation communities within the mosaic floodplain wetland on the Bank. The rehabilitation and re-establishment wetland areas have a mix of hydrologic and microtopographic conditions, including channel benches, mosaic wetland habitat with hummocks, and PAB ponds. To compliment these different habitats and provide vegetative diversity and structure, a variety of native species were selected that will thrive in the assorted conditions that span the site. Native plant species installed at the Bank are detailed in Table B6 and adaptive management vegetation community adjustments are described in Section B2.8.4.

Emergent Floodplain Wetland Mosaic

The stream channels contain benches that are approximately 0.5 feet lower than the surrounding floodplain. These benches were designed to be inundated during the average annual flow. Native emergent vegetation adapted to seasonal inundation and flowing water was planted on these benches. This vegetation will help stabilize the benches, while also promoting sediment retention and providing important habitat for fish and aquatic dependent wildlife species.

Scrub-Shrub Floodplain Wetland Mosaic

The vegetation planted beyond the outer edges of the emergent zones is a mix of native shrub and emergent vegetation that is adapted to shallow inundation. This overhanging vegetation provides thermal regulation, fish refuge from predators, input of macroinvertebrate prey items, and detrital input.

Forest Floodplain Wetland Mosaic

The surrounding floodplain wetlands contain a mix of native coniferous and deciduous tree and shrub vegetation. The species planted in this area are adapted to extended periods of inundation as well as shallow groundwater. These species (e.g., willow, alder, cottonwood) are also able to withstand varying degrees of sediment accretion, which is expected to occur in various areas of the site during flood events.

Existing Forest Floodplain Wetland

Existing forested areas were retained where possible to maintain deciduous forest canopy within the Bank. In several areas along the margins of the Existing Forest Floodplain zones, understory plantings were voluntarily installed to increase species diversity within the understory. Voluntary understory plantings may also out-compete reed canarygrass and provide additional habitat for various birds, mammals and insects.

Forest Floodplain Hummocks

Forest Floodplain Hummock vegetation communities were established on the hummocks interspersed through the three wetland mosaic vegetation communities identified previously. These areas were planted with a mix of coniferous and deciduous trees and shrubs that are native to functioning riparian and wetland buffers throughout the Puget Sound Lowlands. The Forest Floodplain Hummocks provide upland habitat within the floodplain wetland mosaic vegetation communities to create habitat interspersion and allow the establishment of coniferous tree species within the floodplain.

Forested Upland

The forested upland areas in the northeast and northwest portions of the Bank serve to protect the stream and floodplain wetland habitat, while also providing upland habitat to a variety of species. The forested uplands were planted with a mix of coniferous and deciduous trees and shrubs that are native to functioning riparian and wetland buffers throughout the Puget Sound Lowlands. As this densely planted vegetation matures, it will serve to screen the floodplain habitats from surrounding land uses, trap and filter sediment from stormwater runoff, and provide habitat to various birds, mammals and insects.

B2.8.3 Planting

Planting included native trees, shrubs, groundcovers, ferns, and emergent species (Table B6) as indicated on the project plans (Herrera 2013b) with revisions documented in this Appendix and construction memorandums submitted to the IRT and contained in the Bank Resource Folder. Standard spacing of 10 to 12-foot on-center for trees, 5-foot on-center for shrubs, and 1.5- or 2.5-foot on-center for groundcover, ferns, and emergent species was used for plant installation. Plants were installed between 2014 and 2016. Table B6 identifies the native tree, shrub, groundcover and emergent species installed at the Bank.

TABLE B6. COMPOSITION OF NATIVE PLANTS

Stratum	Scientific Name	Common Name				
Emergent Floodplain Wetland Mosaic (PEM)						
Emergent	Carex obnupta	Slough sedge				
	Carex stipata	Saw-beak sedge				
	Carex utriculata	Beaked sedge				
	Eleocharis palustris	Creeping spikerush				
	Scirpus acutus	Hardstem bulrush				
	Scirpus microcarpus	Small-fruited bulrush				
	Sparganium emersum	Narrow-leaf bur-reed				

TABLE B6. COMPOSITION OF NATIVE PLANTS (CONTINUED)

	Scrub-Shrub Floodplain Wetland Mosaic (PSS)	
Groundcover/Fern	Athyrium filix-femina	Lady fern
	Cornus sericea	Red-twig dogwood
	Lonicera involucrata	Black twinberry
	Malus fusca	Crabapple
	Physocarpus capitatus	Pacific ninebark
	Rosa pisocarpa	Peafruit rose
	Salix geyeriana	Geyer's willow
	Salix hookeriana	Hooker's willow
	Salix sitchensis	Sitka willow
	Vibernum edule	Highbush cranberry
Tree	Salix lasiandra	Pacific willow
	Forest Floodplain Wetland Mosaic (PFO)	
Groundcover/Fern	Athyrium filix-femina	Lady fern
	Cornus sericea	Red-twig dogwood
	Lonicera involucrata	Black twinberry
	Malus fusca	Crabapple
Scrub-Shrub	Physocarpus capitatus	Pacific ninebark
Scrub-Siliub	Ribes divaricatum	Spreading gooseberry
	Rubus spectabilis	Salmonberry
	Sambucus racemosa	Red elderberry
	Vibernum edule	Highbush cranberry
	Alnus rubra	Red alder
	Crataegus douglasii	Black hawthorn
	Fraxinus latifolia	Oregon ash
	Populus balsamifera	Black cottonwood
Tree	Populus tremuloides	Quaking aspen
	Picea sitchensis	Sitka spruce
	Rhamnus purshiana	Cascara
	Salix lasiandra	Pacific willow
	Thuja plicata	Western red cedar

TABLE B6. COMPOSITION OF NATIVE PLANTS (CONTINUED)

Existing Forest F	Toodplain Wetland (Existing PFO) with Voluntary Unde	rstory Plantings
Groundcover/Fern	Athyrium filix-femina	Lady fern
	Cornus sericea	Red-twig dogwood
	Lonicera involucrata	Black twinberry
	Malus fusca	Crabapple
	Physocarpus capitatus	Pacific ninebark
Scrub-Shrub	Rosa pisocarpa	Peafruit rose
	Salix geyeriana	Geyer's willow
	Salix hookeriana	Hooker's willow
	Salix sitchensis	Sitka willow
	Vibernum edule	Highbush cranberry
Tree	Salix lasiandra	Pacific willow
	Forest Floodplain Hummocks	
Groundcover/Fern	Polystichum munitum	Sword fern
	Acer circinatum	Vine maple
	Amelanchier alnifolia	Serviceberry
	Cornus sericea	Red-twig dogwood
Scrub-Shrub	Ribes divaricatum	Spreading gooseberry
	Rosa nutkana	Nootka rose
	Rubus spectabilis	Salmonberry
	Symphoricarpos albus	Snowberry
	Picea sitchensis	Sitka spruce
Tree		
Tree	Thuja plicata	Western red cedar

TABLE B6. COMPOSITION OF NATIVE PLANTS (CONTINUED)

Forested Upland (UPL)					
Croundsover/Forn	Polystichum munitum	Sword fern			
Groundcover/Fern	Rubus ursinus	Pacific blackberry			
	Acer circinatum	Vine maple			
	Amelanchier alnifolia	Serviceberry			
	Corylus cornuta	Beaked hazelnut			
Corub Chrub	Holodiscus discolor	Oceanspray			
Scrub-Shrub	Oemleria cerasiformis	Indian plum			
	Rubus parviflorus	Thimbleberry			
	Sambucus racemosa	Red elderberry			
	Symphoricarpos albus	Snowberry			
	Acer macrophyllum	Big-leaf maple			
Tree	Alnus rubra	Red alder			
	Pinus monticola	Western white pine			
	Pseudotsuga menziesii	Douglas fir			
	Tsuga heterophylla	Western hemlock			

B2.8.4 Adaptive Management Vegetation Community Adjustments During Construction

The Bank was designed and graded based on an estimated range of long-term sustained base flow (SBF) water surface elevation (WSE) ranging from 11.0 feet to 12.0 feet with an average WSE of 11.5 feet (Port of Tacoma – MLLW datum). Higher than planned SBF WSEs were observed during construction in the summer of 2015 in comparison to WSE observations at the site from 2011 to 2014 due to a significant downstream bloom of common waterweed (*Elodea canadensis*). Planned and observed WSE ranges at the site were analyzed (Herrera 2015), concluding that the longer-term average SBF WSE could be as high as 12.0 feet with an upper limit of 12.8 feet based on subsequent evaluation of WSE monitoring data and modeling of the hydraulic effect that common waterweed can have on WSE at the site. Therefore, adaptive management actions were conducted during construction with informal review by the IRT.

The potential for a higher than planned range of SBF WSE has the largest effect on the establishment of woody plants on low-lying wetland floodplain areas at ground elevations between 11.5 and 12.8 feet. This range of SBF WSE has potential to occur during the growing season (March through October) when prevailing water levels have the most influence on plant establishment. Previously, plants growing in this ground elevation range were not expected to be inundated during low to average SBF and only plants on ground elevations less than 12.0 feet were expected to be temporarily (i.e., sustained for less than two months during the growing season) inundated during times of high SBF at depths upwards of 0.5 feet. Based on the subsequent evaluation of WSE (Herrera 2015), plants at ground elevations less than 12.0 feet could be frequently inundated for most of the growing season in some years. Plants occurring at ground elevations between 12.0 and 12.8 feet could be temporarily inundated during periods of high SBF.

Plant species were originally selected for plant zones based on their adaptation and tolerance to inundation depth and frequency. For example, plant species with lower tolerance to inundation were selected for the

Forest Floodplain Wetland Mosaic on higher ground elevations, whereas plants species with higher tolerance to inundation were selected for the Emergent Floodplain Wetland Mosaic and Scrub-Shrub Floodplain Wetland Mosaic zones on relatively lower ground elevations. Some of the plant species that were originally selected for the Scrub-Shrub Floodplain Wetland Mosaic zone are not tolerant of prolonged inundation associated with a future longer-term average SBF WSE of 12.0 feet and an upper limit SBF WSE of 12.8 feet. Therefore, this zone was divided into two subzones; Frequently Flooded and Transitional.

Many woody-stemmed wetland species can persist at the higher than planned range of SBF WSE; however, during construction adaptive management measures were necessary to support success of proposed floodplain wetland mosaic vegetation communities. To better assure plant survival and establishment, adjustments were made to the boundaries, locations, and plant species composition of floodplain wetland mosaic plant zones such that they are better suited to inundation associated with the greater potential range of longer-term SBF WSE (Figure B7). In addition, prior to installation, a wetland biologist assisted with plant layout within each plant zone including positioning of plant species at varying elevations according to their inundation tolerance.

Vegetation Community Revisions

Plant zone adjustments were conducted during construction as summarized below. Within all of the revised plant zones, plants were spaced according to originally proposed on-center spacing. Also, where live stakes are planned, they were installed as pairs at each on-center planting location as originally proposed.

- Forest Floodplain Wetland Mosaic: To support survival and establishment of plants with less tolerance to inundation, the low ground elevation limit of planting was adjusted to approximately 12.8 feet, thereby minimizing the potential for sustained temporary inundation associated with the modified upper limit of SBF WSE as shown on Figure B7.
- Scrub-Shrub Floodplain Wetland Mosaic: Two distinct plant subzones within the Scrub-Shrub Floodplain Wetland Mosaic zone were designated at different ground elevation ranges corresponding to potential SBF WSE. Originally specified plant species were retained and installed, but were redistributed to each subzone based on relative inundation tolerance.
 - Frequently Flooded Zone: Only live stakes were installed in this zone; consisting of originally specified willow plant species on low-lying areas between 11.5 and 12.5 feet elevation. At these elevations, willow plant species are more tolerant of frequent and longer periods of sustained temporary inundation (i.e., up to two months). Live stakes were installed at a length of 48 inches (four feet) instead of the range of 24 inches to 42 inches specified in the Basis of Design report (BDA et al. 2013). The additional length was intended to prevent submersion which can lead to failed establishment or mortality. The live stakes were installed in the ground at the originally planned 2-foot depth, thereby providing at least 1 foot above the water surface during times of high SBF WSE. Plant species in this subzone include Pacific willow (Salix lasiandra), Geyer's willow (S. geyeriana), Hooker willow (S. hookeriana), and Sitka willow (S. sitchensis).
 - **Transition Zone:** Only originally specified container-grown plant materials were installed on relatively higher ground between 12.5 and 12.8 feet elevation. At these elevations, these originally specified plant species are more suited for shorter periods of sustained temporary inundation (i.e., less than one month). Plant species include red twig dogwood (*Cornus sericea*),

black twinberry (*Lonicera involucrata*), crabapple (*Malus fusca*), Pacific ninebark (*Physocarpus capitatus*), and peafruit rose (*Rosa pisocarpa*).

Additional adaptive management revisions were implemented as needed during construction. These revisions are summarized below.

- The emergent vegetation along the edges of the two PAB ponds were shifted from a lower elevation of 8.5 feet to elevation 10.5 feet to allow bare-root stock to become established during higher than anticipated SBFs. Displaced scrub-shrub species were relocated within a 20-foot-wide reed canarygrass management zone within retained existing forested and scrub-shrub habitats (Figure B7). In these areas, reed canarygrass was managed by mowing and/or herbicide treatment and shrub species were installed. The Port will continue to manage reed canarygrass in these areas as installed plants become established.
- The originally proposed quantity of highbush cranberry (*Viburnum edule*) was not available from local nurseries. Of the 913 cranberry plants delivered to the site, 840 were rejected because they did not meet the 12- to 18-inch height requirement in the construction specifications. Additional suppliers were contacted and no suppliers had this species in stock, nor were they willing to contract grow the species due to its high mortality rate during propagation and the low demand for the species. Therefore, additional red-twig dogwood, black twinberry, peafruit rose, Pacific ninebark, salmonberry (*Rubus spectabilis*) and willow species were installed as substitutes.
- Lady fern (*Athyrium filix-femina*) was relocated to higher elevations due to higher than anticipated SBFs. Lady fern was installed above elevation 12 feet on the north side of retained existing forested areas to provide partial shade as shown in Exhibit B3. To account for less bare-root plants, the remaining plants were spaced at 20 inches on-center instead of the originally planned 18 inches. In addition to the bare-root installations, in accordance with the May 20, 2015 "Alternative Wetland Seed Mix & Emergent Seed Option" memorandum, the stream edges were also seeded with the Alternative Wetland Seed Mix that contained eight additional grass and emergent species.
- Three additional species were selected for the forested upland which are adapted to variable moisture conditions with greater sun exposure. Scouler's willow (Salix scouleriana) was added because it is adapted to upland conditions that are seasonally wet including low-lying and depressional areas. Bald-hip rose (Rosa gymnocarpa) was added because it is suited to upland conditions and performs well in moist to dry settings. Coastal strawberry (Fragaria chiloensis) was added to provide diversity in the groundcover stratum in areas with sun exposure.
- The Port retained a new emergent floodplain wetland area in the Bank. This zone was seeded with the wetland seed mix during the fall of 2014 and was originally planned for planting as part of a Scrub-Shrub Wetland Floodplain plant zone. Since it was seeded, this zone has established into a dense and diverse emergent plant community colonized by native species from the seed mix and others that established from the existing seed bank (i.e., volunteers). This new emergent area will be maintained with the objective of increasing plant community diversity on the Bank. Small patches of Scrub-Shrub Floodplain Wetland Mosaic area are included within this emergent zone to increase habitat interspersion.
- In support of further enhancing wetlands on the Bank, the Port voluntarily conducted additional planting associated with expanding floodplain wetland zones to establish native vegetation in Existing Forested

- Floodplain Wetland areas where supplemental reed canarygrass control measures (mowing and herbicide treatments) were implemented during construction.
- An additional 25-square-foot area of live stake planting was installed on the west bank of Clear Creek directly downstream of the deflector structure that diverts flow into the new main channel near the upstream limits of the Bank. This additional planting was intended to prevent potential bank erosion during high flows by increasing soil cohesion.

B2.8.5 Soil Preparation

Upon achieving final grade and prior to seeding and stabilization, the contractor and the Port's representative assessed the graded areas for excessive soil compaction. The staging area in the northeast corner of the site was ripped four to six inches in depth, back-bladed and "track-walked" at the same time to prepare compacted soils in the forested uplands for hydroseeding and planting. Care was taken to ensure cross ripping maintained the designed topography.

B2.8.6 Seeding

To prevent soil erosion and support native re-vegetation efforts, disturbed areas were seeded with a certified weed free, native grass mix (Tables B7 and B8). In addition to native species, sterile wheatgrass seed was applied to disturbed areas to further prevent soil erosion. The quick germination rate of wheatgrass quickly stabilizes soil, and the sterile nature prevents additional germination and growth during the following year allowing native grass species to thrive.

Seeding of exposed soil occurred in 2014 and 2015. Seeding was accomplished by hydroseeding and was applied at the rates shown below on Tables B7 and B8.

TABLE B7. COMPOSITION OF SEED MIX FOR THE BANK (2014)

Scientific Name	Common Name	Pounds Pure Live Seed (PLS) Per Acre
Calamagrostis canadensis	Bluejoint reedgrass	0.28
Deschampsia caespitosa	Tufted hairgrass	0.25
Elymus glaucus	Blue wildrye	4.66
Festuca rubra	Red fescue	1.25
Juncus ensifolius	Dagger-leaf rush	0.04
Juncus tenuis	Slender rush	0.04
Glyceria occidentalis	Western mannagrass	3.20
Triticum aestivum	Regreen sterile wheatgrass	43.56
	Totals:	53.29 (120 seeds per square foot)

Seed germination success was evaluated during the spring of 2015 for those areas that were seeded during the fall of 2014. The germination success of fall seeding efforts in wetland plant zones was variable across the site and several areas had sparse cover. The sparse cover was likely attributed to lack of sufficient time for seed to germinate during fall months due to a flood event that occurred soon after

seeding took place and/or based on frequent inundation of water over the winter. Therefore, an alternative wetland seed mix (Table B8) was developed for 2015 seeding efforts that was better suited for emergent plant zones and wetland areas that are more frequently inundated with water.

TABLE B8. ALTERNATIVE COMPOSITION OF SEED MIX FOR THE BANK (2015)

Scientific Name	Common Name	Percent of Mix	Pounds Pure Live Seed (PLS) Per Acre
Juncus ensifolius	Dagger-leaf rush	9	0.03
Deschampsia caespitosa	Tufted hairgrass	10	0.26
Carex obnupta	Slough sedge	9	1.38
Festuca rubra	Red fescue	8	1.05
Carex stipata	Sawbeak sedge	9	1.12
Eleocharis palustris	Spike rush	9	0. 95
Juncus acuminatus	Tapered rush	8	0.02
Juncus balticus	Baltic rush	9	0.05
Scirpus microcarpus	Small-fruited bulrush	9	0.07
Glyceria occidentalis	Western mannagrass	8	2.67
Elymus glaucus	Blue wildrye	8	3.89
Triticum aestivum	Regreen sterile wheatgrass	4	21.78
	Totals:	100	33.26 (150 seeds per square foot)

B2.8.7 Fertilizing

Disturbed areas requiring seeding were fertilized with a slow release natural organic fertilizer applied with the hydroseed mix. The fertilizer supported seed germination and plant growth. Hydroseed mix was applied at a rate of 1,800 pounds per acre.

B2.8.8 Irrigation

Installed plants will be irrigated, as needed, during the first two summers following planting. This will be particularly important for plants on the upper elevations of hummocks and in the uplands. Irrigation consists of a temporary above ground system and will occur approximately once every 2 to 3 days during the summer and early fall, depending on the outside temperatures, recent precipitation, and soil saturation levels. Irrigation will be used during dry periods when young plantings are susceptible to severe drought stress; however, irrigation use will also be appropriately balanced to allow the installed vegetation to develop deep roots that can reach the groundwater table within one to three years after installation.

B2.9 Bank Buffers

The following sections describe the designated non-creditable buffers for the Bank (Bank buffer[s]) and the existing and potential future surrounding land uses that were used to establish the Bank buffer widths. Additional information regarding Bank buffers, including the functions provided by the buffers, is contained in the *Bank Buffer Establishment Memorandum* in the project Resource Folder and figures depicting the Bank buffers are included in Appendix B of this Instrument (Figure B1 and B2).

Non-creditable Bank buffers are overlain on mitigation actions planned at the Bank as described in Appendix B, Figures B1 thru B7. No Universal Credits are generated within the Bank buffers.

B2.9.1 Northern Boundary

Approximately 890 feet of the northern Bank boundary abuts the EPA site. No Bank buffer was established along the EPA site because this mitigation area is also protected by a long-term protection mechanism (conservation easement) and includes a 110-foot-wide enhanced forested upland buffer adjacent to residences and Gay Road. The remaining approximately 440 feet of the northern Bank boundary is a 100-foot-wide enhanced forested upland Bank buffer adjacent to residences and Gay Road that is densely planted with native trees, shrubs and herbaceous species. This Bank buffer width is consistent with Pierce County guidance to protect Category II wetland habitat adjacent to moderate-intensity land uses. Future land use adjacent to the Bank is expected to remain moderate-intensity due to: 1) current zoning, 2) adjacent Category II wetland habitat extending offsite, and 3) the designation of the Bank and surrounding vicinity as floodway.

B2.9.1.2 Eastern Boundary

The eastern edge of the Bank is adjacent to four habitat conditions: 1) rural residential structures, 2) mowed uplands, 3) mowed wetlands, and 4) forested wetlands. Buffer widths along the eastern edge of the Bank protect the Bank functions based on existing and potential future habitat conditions and land uses adjacent to the eastern edge of the Bank. The northern approximately 850 feet of the eastern Bank boundary is 100-foot-wide enhanced forested upland Bank buffer where densely planted native trees, shrubs, groundcover and herbaceous species have been installed to protect the Bank from adjacent moderate-intensity uses (i.e., residential building site and mowed uplands). The 100-foot-wide Bank buffer continues south into the wetland rehabilitation habitat to protect the Bank from adjacent mowed wetland habitat. The Bank buffer then transitions to a 75-foot-wide buffer for the southern approximately 700 feet of the eastern boundary (southeastern Bank buffer), where the Bank is adjacent to forested wetland habitat. This reduced buffer width reflects low-intensity current use of the adjacent forested wetland habitat and the low risk of future development, including wetland fill, due to the protections afforded to the offsite Category II wetland within designated floodway.

B2.9.1.3 Southern Boundary

The forested Category II wetland also extends offsite to the south through Pierce County designated floodway (Figure A4), as described above for the southeastern Bank buffer. The parcel located adjacent to the Bank to the south is landlocked by adjacent parcels with no road access, which limits the likelihood of tree removal on this parcel. Also, the predominant tree species within this parcel is black cottonwood (*Populus trichocarpa*), which is easily decayed and not very strong (Steinberg 2001). Therefore, commercial harvest of the trees on this parcel is not cost-effective and the risk of such an activity occurring is very low. Therefore, this portion of the Bank is protected with a 50-foot-wide non-creditable buffer.

B2.9.1.4 Western Boundary

The western edge of the Bank is adjacent to a 40-foot-wide DD10 parcel (located on the left bank of Clear Creek) that is sloped towards Clear Creek and consists of groundcover, shrubs, and trees. Clear Creek is classified as a Type F2 stream according to Pierce County Code (PCC) Chapter 18E.40.060 based on fish-bearing status and adjacency to a landslide hazard area. Clear Creek is a Type 3 water according to the Washington Department of Natural Resources (WDNR) interim water typing system (WAC 222.16.131) based on moderate to slight fish, wildlife, or human use. The approximately 10-foot-wide Clear Creek is classified as a critical area and therefore has a critical area buffer of 150 feet, which extends through the

adjacent 40-foot-wide DD10 parcel. Future land use on the western boundary is expected to remain low due to: 1) current zoning, 2) the narrow and sloped nature of the DD10 parcel, 3) Clear Creek critical area classification and associated buffer, and 4) the designation of the area as floodway. Therefore, this portion of the Bank is protected with a 50-foot-wide non-creditable buffer, which includes Clear Creek.

B3.0 BANK DESIGN OBJECTIVES AND POST CONSTRUCTION CONDITIONS

B3.1 Bank Design Objectives

The goals of the Bank are to rehabilitate and re-establish wetland hydrology, floodplain connectivity, and aquatic resource habitat to improve habitat functions for anadromous fish and aquatic-dependent avian and wildlife species. The specific design objectives of the Bank were developed to reverse the adverse impacts of human disturbance to the site and include:

- Re-establish 4.18 acres of riverine forested wetlands and anadromous fish habitat
- Rehabilitate 22.05 acres of degraded depressional wetland habitat into riverine forested wetlands and anadromous fish habitat
- Re-establish Clear Creek and off-channel habitat through the restored floodplain wetlands
- Reduce the potential fish stranding as flood flows recede
- Install 32 hummocks with LWM to provide niche habitat for plant communities and wildlife species
- Install 105 channel, wetland, and hummock roughening LWM structures
- Install 13 standing tree snags to support aquatic dependent avian use
- Enhance 1.61 acres forested upland habitat with native vegetation

Specific actions designed to accomplish these objectives are described in the following sections and include excerpts from the joint wetland mitigation guidance document *Wetland Mitigation in Washington State Part 1: Agency Policies and Guidance* (Ecology et al. 2006).

B3.2 Wetland Re-establishment Actions

The Bank includes re-establishment of 4.18 acres of riverine forested, scrub-shrub, and emergent floodplain wetland mosaic communities. Wetland re-establishment will occur in two portions of the site: 1) in northern portion of the site, where baseline conditions consist of upland fields dominated by invasive species; and 2) along the western edge of the site, where baseline conditions include the side-cast berm levee. In both areas historic fill material, invasive species, and agricultural features were removed and the areas were graded to intercept shallow groundwater and/or seasonal surface inundation, and a diverse assemblage of native trees, shrubs, and emergent species were installed to contribute to the overall floodplain wetland mosaic at the Bank.

Joint wetland mitigation guidance defines re-establishment as:

The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural or historic functions to a former wetland. Re-establishment results in rebuilding

a former wetland and results in a gain in wetland acres [and functions]. [Activities could include removing fill, plugging ditches, or breaking drain tiles.]

The re-establishment portions of the site meet this definition because the areas were historic riparian wetlands that were filled to accommodate human uses. Removal of fill within these former wetlands meets the criteria for re-establishment. Removal of the historic fill material also functions to remove invasive reed canarygrass. Additional actions that further improve the functions of wetland re-establishment include construction of two flow diversion structures and nine alcoves and installation of 13 LWM structures along Clear Creek where the side-cast berm levee was previously located. Restoration actions conducted in the northeastern wetlands re-establishment area included installation of seven hummocks and 18 LWM structures. All wetland re-establishment areas were replanted with a diverse assemblage of native tree, shrub and/or emergent species as described in Section B2.8.

B3.3 Wetland Rehabilitation Action

The Bank will rehabilitate 22.05 acres of riverine forested, scrub-shrub, and emergent floodplain wetland mosaic communities and anadromous fish habitat by reinstating sustainable environmental processes that were historically removed from the site though human activities. Rehabilitation actions include removing (breaching) the side-cast berm levee that was present along the right (east) bank of the entire project reach of Clear Creek, realigning Clear Creek through the historic floodplain wetlands, and removing the drainage ditch and multiple drain tiles located within the wetland. The side-cast berm levee degraded wetland habitat and impaired floodplain functions including flood water storage during low to moderate flood events, LWM recruitment, habitat diversity and function and ecological processes. Connecting the depressional wetland to Clear Creek will restore the wetland to its historic riverine hydrogeomorphic class and restore ecological processes including overbank flooding synchronization, groundwater recharge, and biogeochemical functions throughout the rehabilitation floodplain wetland areas.

The wetlands at the Bank were degraded by human activities over roughly the last century. Clear Creek was relocated from a braided channel configuration on the site to a confined channel between the railroad grade and a side-cast berm levee, which isolated the creek from the wetland during most flows. These historic alterations changed the hydrogeomorphic class of the wetland from riverine to depressional and created a fish stranding hazard throughout the majority of the wetland during flood events. The degraded wetlands were also deforested, drained and filled to promote agricultural crop production. The restoration activities described in this Appendix will rehabilitate the wetlands at the Bank by reversing the human actions that degraded the aquatic resources and fish habitat of the Bank, which will restore the predisturbance riverine hydrogeomorphic class of the wetland. The southeast PAB pond outlet channel and a portion of the constructed main channel were designed to generally resemble historic Clear Creek channel alignments while the remaining constructed floodplain channels were designed around existing forested wetlands to restore floodplain complexity and hydraulic connectivity.

Joint wetland mitigation guidance (Ecology et al. 2006) defines rehabilitation as:

The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural or historic functions [and processes] of a degraded wetland. Rehabilitation results in a gain in wetland function but does not result in a gain in wetland acres. [Activities could involve breaching a dike to reconnect wetlands to a floodplain or returning tidal influence to a wetland.]

The joint guidance (Ecology et al. 2006) also further clarifies the differences between rehabilitation and enhancement with the following statements:

In general, rehabilitation involves actions that are more sustainable and that reinstate environmental processes, at both the site and landscape scales (e.g., reinstating hydrologic processes in a floodplain by breaching dikes). Such actions often restore environmental processes that have been disturbed or altered by human activity. The agencies further define rehabilitation as actions that restore the original hydrogeomorphic (HGM) class, or subclass, to a wetland whose current HGM class, or subclass, has been changed by human activities.

Enhancement typically involves gains in only one or a few functions and can lead to a decline in other functions. Enhancement actions often focus on structural improvements to a site and generally do not address larger-scale environmental processes or even processes at the site scale.

Take a former forested, riverine wetland that was changed to an emergent, depressional wetland by diking and grazing. Rehabilitating the wetland would involve breaching the dike and ending the grazing. In this case the hydrologic processes are reinstated so the wetland becomes a riverine wetland again. Reforesting the wetland without reconnecting it to the riverine system would be considered enhancement because this change is structural and does not reinstate environmental processes.

These descriptions obtained from the joint guidance (Ecology et al. 2006) acknowledge that there are similarities between rehabilitation and enhancement, but also identify that a key element of rehabilitation is the removal of manmade disturbances that have degraded wetland habitat and changed the hydrogeomorphic class of the wetland. The removal of the side-cast berm levee, drainage tiles, and the drainage ditch and realignment of multiple floodplain channels through the site will reinstate environmental processes by removing the manmade alterations that degraded the wetlands and will restore the predisturbance hydrogeomorphic class of the wetland. Therefore, these actions will rehabilitate the wetland habitat at the Bank.

Additional restoration actions within the floodplain wetland rehabilitation area includes the construction of PAB ponds connected to PAB pond outlet channels and hummocks; both of which include LWM structures to increase habitat complexity and fish and aquatic dependent wildlife habitat. Also, invasive reed canarygrass was removed from emergent portions of the wetland and these areas were replanted with a dense assemblage of native trees, shrubs, and emergent species. The installation of coniferous and deciduous trees and re-meandering of multiple floodplain channels through the Bank will also restore future LWM recruitment.

B3.4 Forested Upland Enhancement Action

The Bank includes 1.61 acres of forested upland enhancement. Upland enhancement activities will reverse the adverse effect of human actions within the upland areas by eliminating agricultural activities, installing habitat LWM structures and planting the forested upland (UPL) area with a diverse mosaic of upland trees, shrubs, groundcovers, and herbaceous species. These actions will enhance the uplands from herbaceous dominated plant communities to robust plant communities with multiple canopy layers to screen the Bank aquatic habitat features from surrounding land uses and provide upland habitat for wildlife species including birds and small mammals.

B4.0 BANK DESIGN SUMMARY

The Bank will accomplish multiple restoration objectives described in the Pierce County *Clear/Clarks Creek Basin Plan Volume* 1 – *Basin Plan and SEIS* (2006) including wetland, stream, and riparian habitat restoration and floodplain reconnection and preservation and is consistent with the goals of Pierce County's draft Habitat Conservation Plan (HCP). Clear Creek stream corridor restoration and floodplain repetitive loss acquisitions are identified as the two high-priority recommended projects within the Clear Creek subbasin. Both of these recommended watershed restoration projects encompass the Bank (Pierce County 2006).

Historically, floodplain development replaced riparian floodplain forests with small farms and residences in the lower reaches of the Puyallup and its tributaries in the mid-to-late 1800s. River confinement, channel straightening and disconnection of river floodplain by levees began in 1920s (Puyallup River Watershed Council 2014). The Basin Plan identifies several manmade limiting factors in the Clear Creek subbasin including flooding problems, straightening of the channel, confinement within levees, and reduced riparian buffer (Pierce County 2006). Clear Creek limiting factors identified in the WRIA 10 Salmon Habitat Limiting Factors Report include loss of floodplain connectivity, LWM, pools, side channel habitat, and riparian habitat (Kerwin 1999). The Bank will address these limiting factors by reversing the adverse effects of human impacts that occurred over the last century.

The side-cast berm levee has been removed, hydrologically reconnecting Clear Creek with Bank floodplain wetlands. By realigning Clear Creek through forested and scrub-shrub floodplain wetlands, the site will support long-term LWM recruitment to maintain pools and fish habitat complexity. The Bank floodplain wetlands will also function to shade the stream to maintain cool temperatures, stabilize streambanks/reduce fine sediment, support wildlife, and provide floodplain storage (Pierce County 2006). The Bank will also accomplish a priority action identified by Pierce County by permanently protecting 28.64 acres of floodplain and upland habitat along Clear Creek from future development (Pierce County 2006 and 2011).

Additionally, Pierce County is developing a HCP to mitigate for the County's flood risk reduction maintenance and operations activities. The HCP is planned to be completed in 2019 according to Pierce County's website. The primary goal of the County's HCP is to protect and restore habitats for federally listed species that may be affected by Pierce County Department of Surface Water Management's flood risk reduction activities. Clear Creek and the Bank were initially within one of the four areas identified in the development of the draft HCP. However, in the Fall of 2017 Pierce County removed the Clear Creek area (including the Bank) from the draft HCP. Specific objectives of the plan include improving habitat for federally listed species by:

- Acquiring floodplain parcels, demolishing structures, and removing unneeded levees, and
- Constructing setback levees and restoration projects that provide floodplain connectivity, activate side channels or provide other important habitat features.

The Bank, and potential future expansion of the Bank in this area, will not conflict with the County's HCP as the Clear Creek area has been removed from the draft HCP.

B5.0 SITE CONSTRUCTION DETAILS

B5.1 Construction Overview

Construction grading started on the upstream/south three-quarters of the Bank during the summer of 2014. Floodplain excavation of soils containing reed canarygrass (shoots, seed, and roots) was completed for the majority of the site moving from south to north. Additional grading conducted in 2014 included construction of the main channel, secondary overflow channel, two PAB pond outlet channels, alcoves, and hummocks. Shrubs, trees, and emergent plant species were installed between September 2014 and February 2015 in the southern approximately three-quarters of the site.

Construction grading efforts in 2015 focused on the downstream/north quarter of the Bank, including excavation of additional soils containing reed canarygrass and construction of additional alcoves and elevated hummocks. During 2015, the remaining LWM structures were installed. The new main channel was connected to Clear Creek and a diversion structure was installed in Clear Creek to divert the majority of the flow into the new main channel. The side-cast berm levee was removed and bank roughening structures and alcoves were installed along Clear Creek. Hydroseeding and emergent plant installation were conducted during the summer of 2015 and the remaining plantings were installed between November 2015 and June 2016.

B5.2 Erosion Control

A TESC plan was implemented at the Bank that included Best Management Practices (BMPs) for avoiding adverse water quality impacts during construction. The TESC plan and BMPs are in accordance with the Stormwater Management Manual for Western Washington (Ecology 2012). Stormwater Pollution Prevention Plan (SWPPP) was also prepared for the Bank project including TESC measures. A copy of the SWPPP, prepared in compliance with the National Pollutant Discharge Elimination System (NPDES) permit requirements, is provided in the Resource Folder. The purpose of the SWPPP was to describe the construction activities and all temporary and permanent erosion and sediment control measures, pollution prevention measures, inspection/monitoring activities and recordkeeping that were implemented during the construction project.

The following BMPs were implemented by the contractor to ensure that water quality standards were met.

- Installation of high-visibility construction fencing to indicate construction limits.
- A stabilized construction entrance along Gay Road East constructed of quarry spalls laid on top of geotextile fabric.
- Placement of silt fences and other measures (e.g. straw wattles, compost socks, etc.) to prevent sediment release from the site.
- During site construction activities, an earthen berm (i.e., plug) remained adjacent to Clear Creek to prevent runoff of sediment into the stream. The plug was removed toward the end of the project during the approved work window when site grading was complete and the site was stabilized.
- Pumping of turbid groundwater encountered during construction to a water quality treatment system (e.g., temporary sediment ponds/infiltration areas, treatment tanks, etc.) prior to release back to the stream.

- Construction of cofferdams and streamflow bypass systems during construction in Clear Creek including construction of LWM deflector structures, LWM bank roughening structures, alcoves, and removal of earthen berms at the constructed floodplain channel inlets and outlet.
- To prevent erosion and sedimentation, after grading activities are complete, the site was stabilized by means of seeding and/or placement of wood chip mulch.

In addition to the TESC plan, the construction contractor was contractually required to prepare a Spill Prevention, Control, and Countermeasure (SPCC) Plan to address the control of pollutants other than sediments during construction.

B5.3 Maintenance

General maintenance will be performed to address conditions that may inhibit or limit the success of the Bank and achieve the performance standards and objectives described in Appendix C. Anticipated maintenance activities fall into two main categories and include, but are not limited to, vegetative maintenance and general maintenance. Vegetative maintenance includes such activities as watering, replanting failed plants to meet contractor requirements or performance standards, repairing any areas subject to erosion, controlling invasive plants, mowing, and deterring herbivores such as voles, beaver, and deer. Spraying weeds at the base of trees and shrubs to discourage voles and root competition may occur for up to two years following planting and must be performed by a licensed applicator. General maintenance activities include: re-installing signs, maintaining fences, and removing garbage. All maintenance activities will be documented in monitoring reports. Initial site maintenance will be the responsibility of the contractor during the two-year warranty period. Areas that are outside the contractor's responsibility will fall upon the Port's Habitat and Stewardship Program. After the warranty period, all the maintenance responsibilities will fall under the Port's Habitat and Stewardship Program. Vegetation and garbage removal within the Bank site will be performed by a stewardship contractor and will be managed by the Port's Environmental Project Manager or Biologist. Maintenance beyond control of invasive species, minor replanting and debris removal will be the responsibility of the Port's Maintenance Staff or a contractor procured by the Port.

B5.4 Invasive Species Control

During the spring of each monitoring year, the mitigation site will be walked by a qualified scientist and areas of invasive vegetation infestation will be noted. A landscape contractor or stewardship manager will then conduct BMPs to control the invasive vegetation prior to it going to seed. BMPs may include hand removal, herbicide application (injection, spot spraying, cut and dab), or other approved and permitted control measures. Invasive vegetation species of particular interest include Himalayan blackberry, cut-leaf blackberry (*Rubus laciniatus*), English ivy (*Hedera helix*), holly (*Ilex aquifolium*), scotch broom (*Cytisus scoparius*), and other noxious weeds on the most current Pierce County Noxious Weed List (Class A, B, and C-listed species). A zero-tolerance policy will be adhered to for all invasive knotweeds (*Polygonum spp.*), purple loosestrife (*Lythrum salicaria*). Additional noxious invasive species may be added pursuant to Article VI.B.2. Eradication measures for occurrences of these species on the site will be promptly conducted throughout the duration of the monitoring period. Areas where invasive vegetation has been removed may be replanted with native vegetation to prevent re-infestation.

B5.5 Construction Inspection and Monitoring

During construction, all BMPs were inspected, maintained and repaired as needed to assure continued performance of their intended function. Site inspections were conducted by a person who is knowledgeable

in the principles and practices of erosion and sediment control. This person had the necessary skills to assess the site conditions and construction activities that could impact the quality of stormwater and assess the effectiveness of erosion and sediment control measures used to control the quality of stormwater discharges.

- A Certified Erosion and Sediment Control Lead was onsite or on-call at all times.
- Whenever inspections and/or monitoring revealed that the BMPs identified in the SWPPP were inadequate, due to the actual discharge of, or potential to discharge, a significant amount of any pollutant, appropriate BMPs or design changes were implemented as soon as possible.

B5.6 Maintaining an Updated Construction SWPPP

- The SWPPP was retained on site or within reasonable access to the site.
- The SWPPP was modified whenever there was a change in the design, construction, operation, or maintenance at the construction site that has, or could have, a significant effect on the discharge of pollutants to waters of the state.
- The SWPPP was modified as necessary to include additional or modified BMPs designed to address changing site conditions.

B6.0 REFERENCES

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Figure B1: Mitigation Actions 180' 360' Note: The locations of all features shown are approximate. This Figure is for informational purposes only and is intended to assist in showing features discussed in the attached document. Neither the Port of Tacoma nor any of it's staff or consultants makes any warranty of any kind for **GRAPHIC SCALE** this information, express or implied, including but not limited to to any warranties or merchantability or fitness for a particular purpose, nor shall the distribution of this information constitute any warranty. Bank buffers are subject to change if permanent protection mechanisms are secured Gay Road ALCOVES **EPA SITE** Northern Pacific Railroad - 60' Width Drainage District 10 - 40' Width **-** 100' \cdot WETLAND **EXTENDS** OFF-SITE **ALCOVES** PAB POND PAB POND **OUTLET CHANNEL SECONDARY OVERFLOW** PAB **CHANNEL POND** OUTLET CLEAR CREEK **CHANNEL** SIDE CHANNEL **ALCOVES** BANK **BOUNDARY** MAIN CHANNEL PAB POND 50' REHABILITATION (22.05 acres total) RE-ESTABLISHMENT (4.18 acres total) 12/05/2018 Legend BANK BUFFER **CLEAR CREEK** WETLAND RE-ESTABLISHMENT WETLAND REHABILITATION (0.80 acres) (20.71 acres) (4.08 acres) (NON-CREDITABLE) FLOODPLAIN CHANNELS AND PAB POND REHABILITATION ALCOVES RE-ESTABLISHMENT (0.88 acres) Tacoma EPA SITE/CHANNELS (0.10 acres) (NON-CREDITABLE) FLOODPLAIN CHANNELS ENHANCEMENT (1.61 acres total) REHABILITATION (0.46 acres) FORESTED UPLAND ENHANCEMENT (1.61 acres) Reference: Imagery, data, and other features obtained and/or derived from Port of Tacoma Upper Clear Creek Mitigation Site (Project No. 098128, Contract No. 069593) topographic survey, construction drawings, and supplemental site field work.

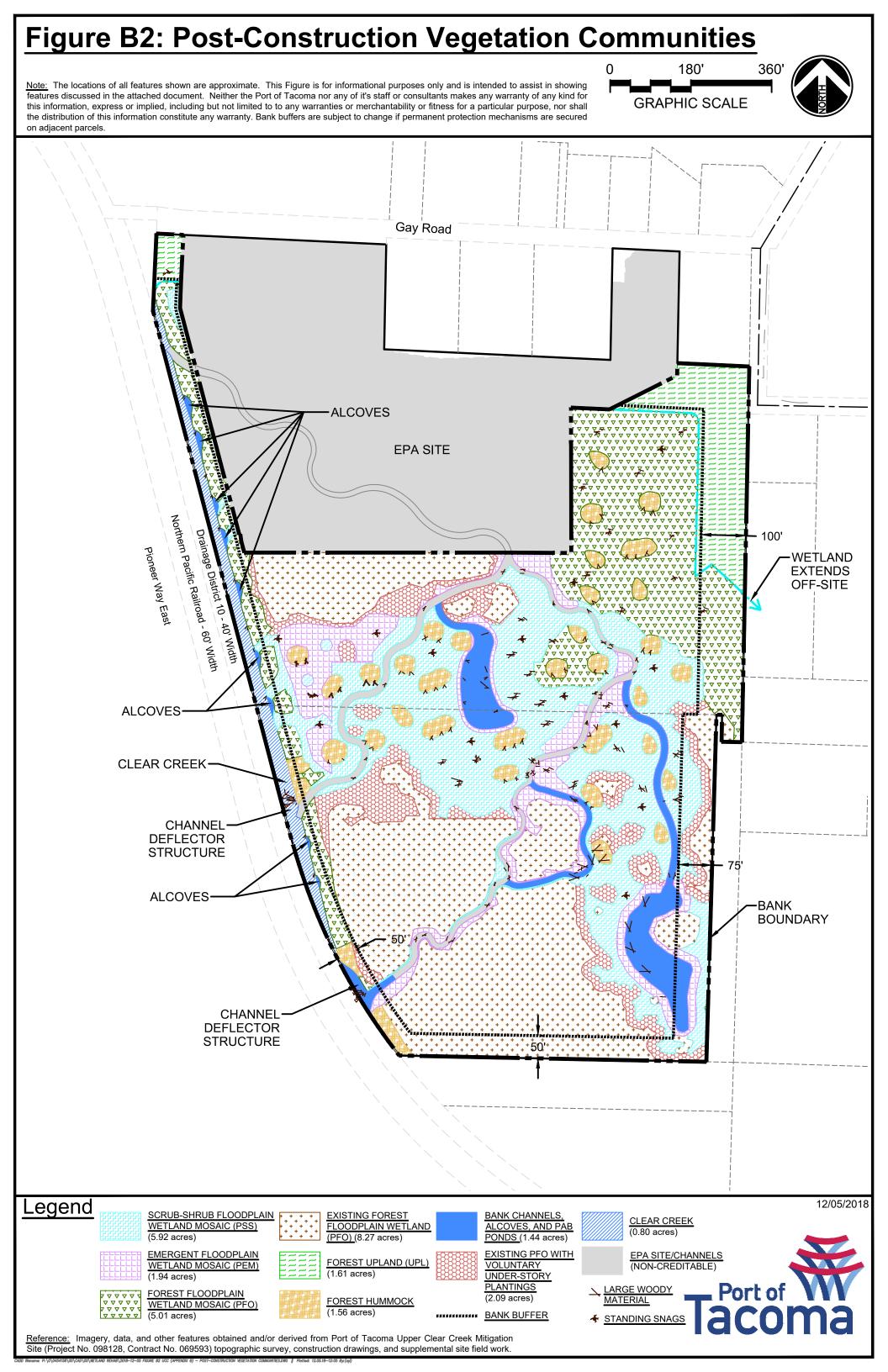
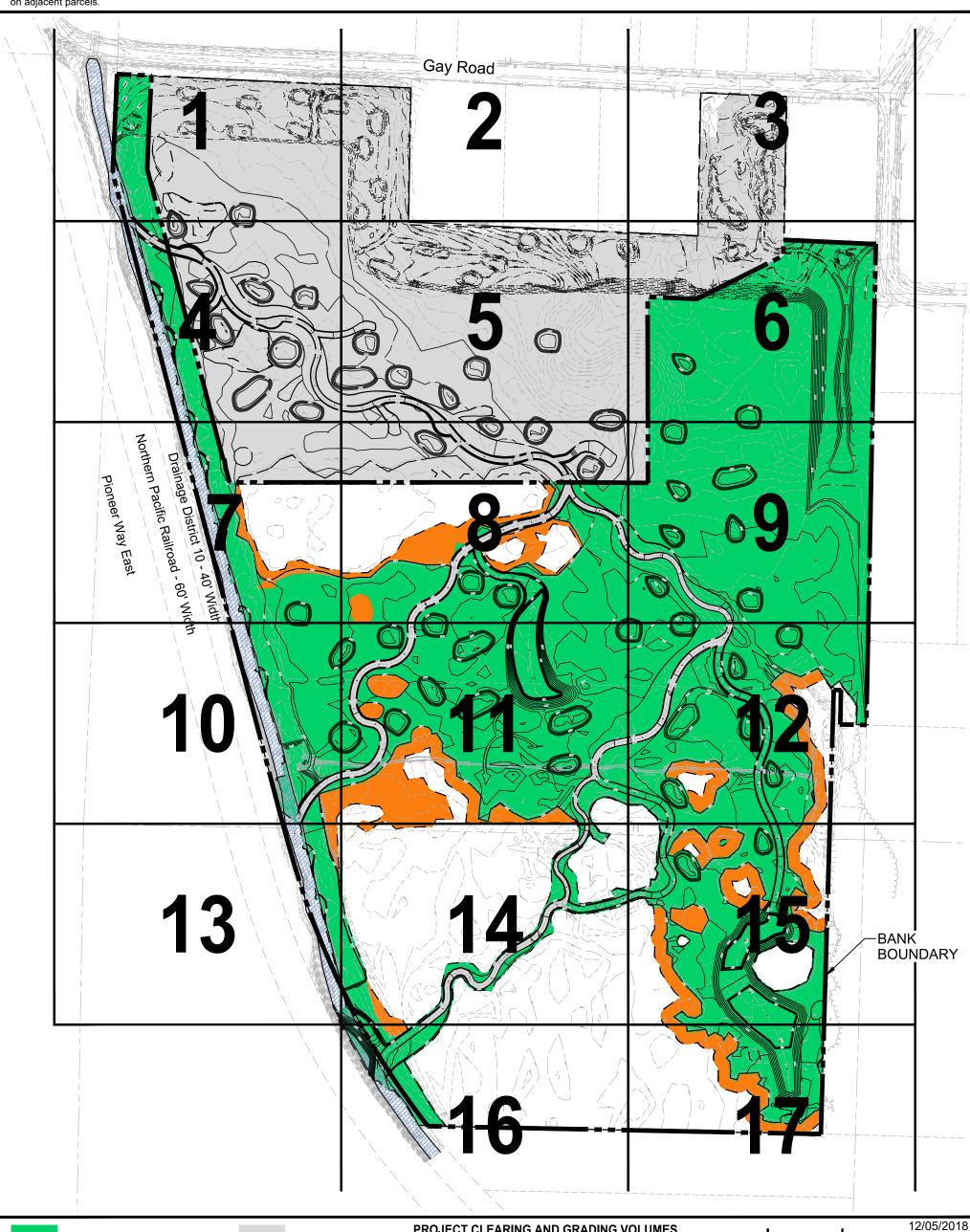


Figure B3: Fish Conservation Actions 180' 360' Note: The locations of all features shown are approximate. This Figure is for informational purposes only and is intended to assist in showing features discussed in the attached document. Neither the Port of Tacoma nor any of it's staff or consultants makes any warranty of any kind for **GRAPHIC SCALE** this information, express or implied, including but not limited to to any warranties or merchantability or fitness for a particular purpose, nor shall the distribution of this information constitute any warranty. Bank buffers are subject to change if permanent protection mechanisms are secured Gay Road ALCOVES **EPA SITE** Northern Pacific Railroad - 60' Width WETLAND **EXTENDS** OFF-SITE ALCOVES: CLEAR CREEK **ALCOVES** BANK **BOUNDARY** 12/05/2018 **ACTIVE CHANNEL MARGIN:** <u>Legend</u> **UPLAND: INVASIVE** PAB PONDS AND **UNARMORED NATIVE** VEGETATION VEGETATION, LOW ANGLE **OUTLET CHANNELS** SIDE CHANNEL (WETLAND RE-ESTABLISHMENT) OFF CHANNELS: TRIBUTARY COLD **ACTIVE CHANNEL MARGIN:** EPA SITE/CHANNELS UNARMORED NATIVE Tacoma VEGETATION, LOW ANGLE (WETLAND REHABILITATION) NATIVE FOREST, IN **CLEAR CREEK UPLAND: NATIVE FOREST IN** HISTORIC FLOODPLAIN FLOODPLAIN (ENHANCEMENT) <u>Reference:</u> Imagery, data, and other features obtained and/or derived from Port of Tacoma Upper Clear Creek Mitigation Site (Project No. 098128, Contract No. 069593) topographic survey, construction drawings, and supplemental site field work.

Figure B4: Clearing and Grading Overview

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PROJECT CLEARING AND GRADING VOLUMES

APPROXIMATE AREA OF VOLUME*

18 ACRES

30,000 CUBIC YARDS

5,300 CUBIC YARDS SOIL; 375

CUBIC YARDS IMPORTED ROCK; 750 CUBIC YARDS COBBLE

AFFECTED AREA TYPE

CLEARING AND GRUBBING

EXCAVATION (CUT)

FILL



INVASIVE SPECIES

EPA SITE/CHANNELS

REMOVAL ONLY POST-CONSTRUCTION CONTOURS (0.5-FOOT)

BASELINE CONTOURS (0.5-FOOT)

CLEAR CREEK

INCLUDES WORK OFF BANK SITE Reference: Imagery, data, and other features obtained and/or derived from Port of Tacoma Upper Clear Creek Mitigation Site (Project No. 098128, Contract No. 069593) topographic survey, construction drawings, and supplemental site field work.

Legend



Figure B5: Groundwater/Surface Ponding Graph



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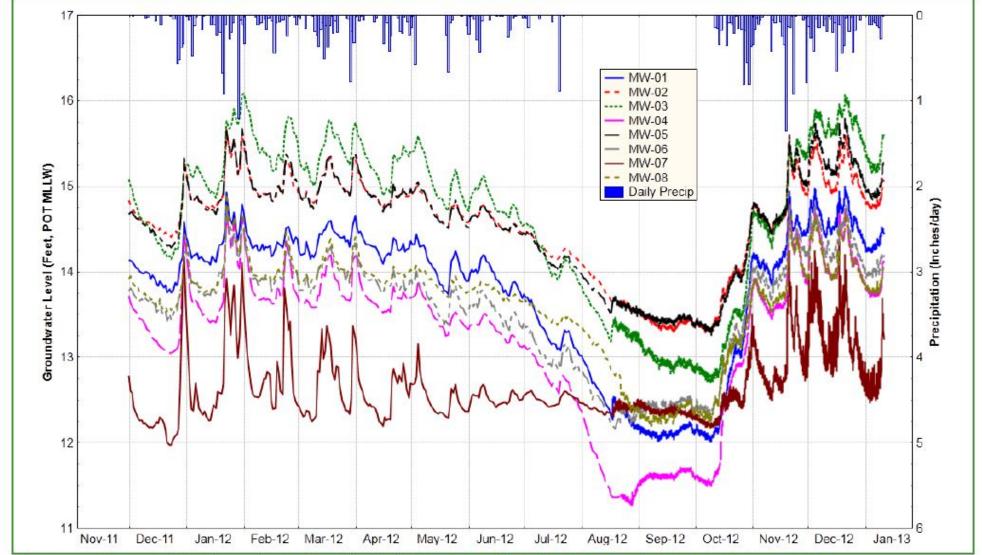


Figure 6. Upper Clear Creek Mitigation Site Groundwater/Surface Ponding Elevations for Monitoring Wells MW-1 through MW-8, November 30, 2011, through January 10, 2013.

TABLE B3. GROUND ELEVATION AND SUMMARY STATISTICS FOR GROUNDWATER/SURFACE PONDING ELEVATION DATA MEASURED AT THE UCCMS FROM NOVEMBER 30, 2011, THROUGH JANUARY 10, 2013 (HERRERA, 2013A).

		Groundw	ater / Surface Ponding	Elevation
Station	Ground Elevation (feet)	Minimum (feet)	Median (feet)	Maximum (feet)
MW-1	13.53	12.01	13.90	15.00
MW-2	13.57	13.29	14.55	15.66
MW-3	14.96	12.70	14.38	16.09
MW-4	13.22	11.26	13.49	14.79
MW-5	13.42	13.27	14.49	15.79
MW-6	14.27	12.16	13.75	14.77
MW-7	14.92	11.97	12.54	14.34
MW-8	13.65	12.18	13.65	14.91

NOTE: All elevations referenced to POT MLLW datum

02/15/2017

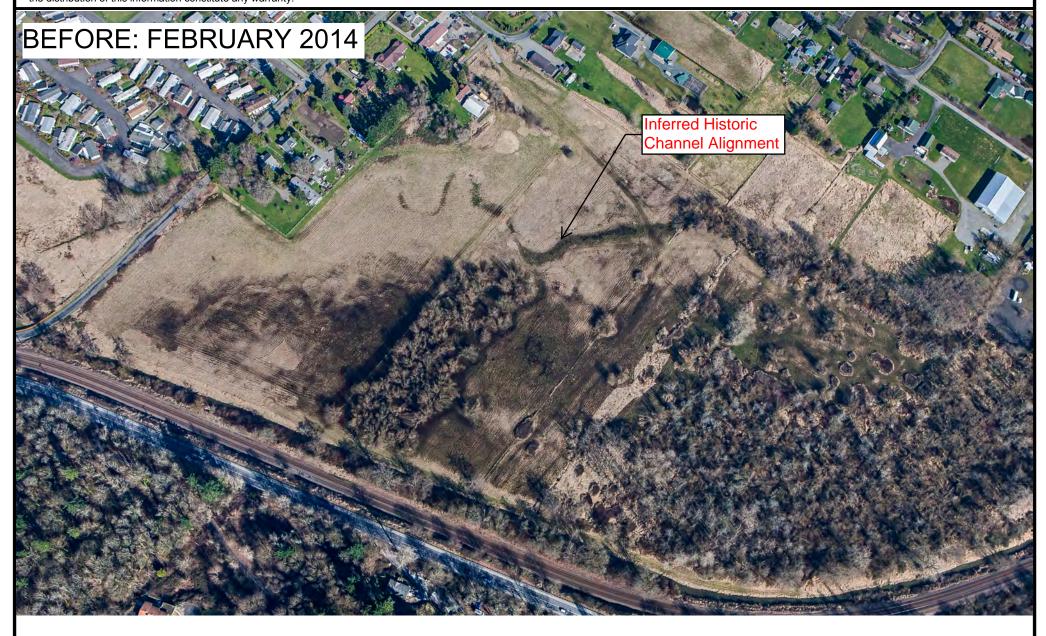


Reference: Information obtained from Hydrologic Monitoring Report Upper Clear Creek Mitigation Site (Herrera, 2013).

Figure B6: Aerial Photographs



Note: The locations of all features shown are approximate. This Figure is for informational purposes only and is intended to assist in showing features discussed in the attached document. Neither the Port of Tacoma nor any of it's staff or consultants makes any warranty of any kind for this information, express or implied, including but not limited to to any warranties or merchantability or fitness for a particular purpose, nor shall the distribution of this information, constitute any warranty.



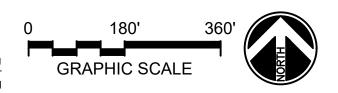


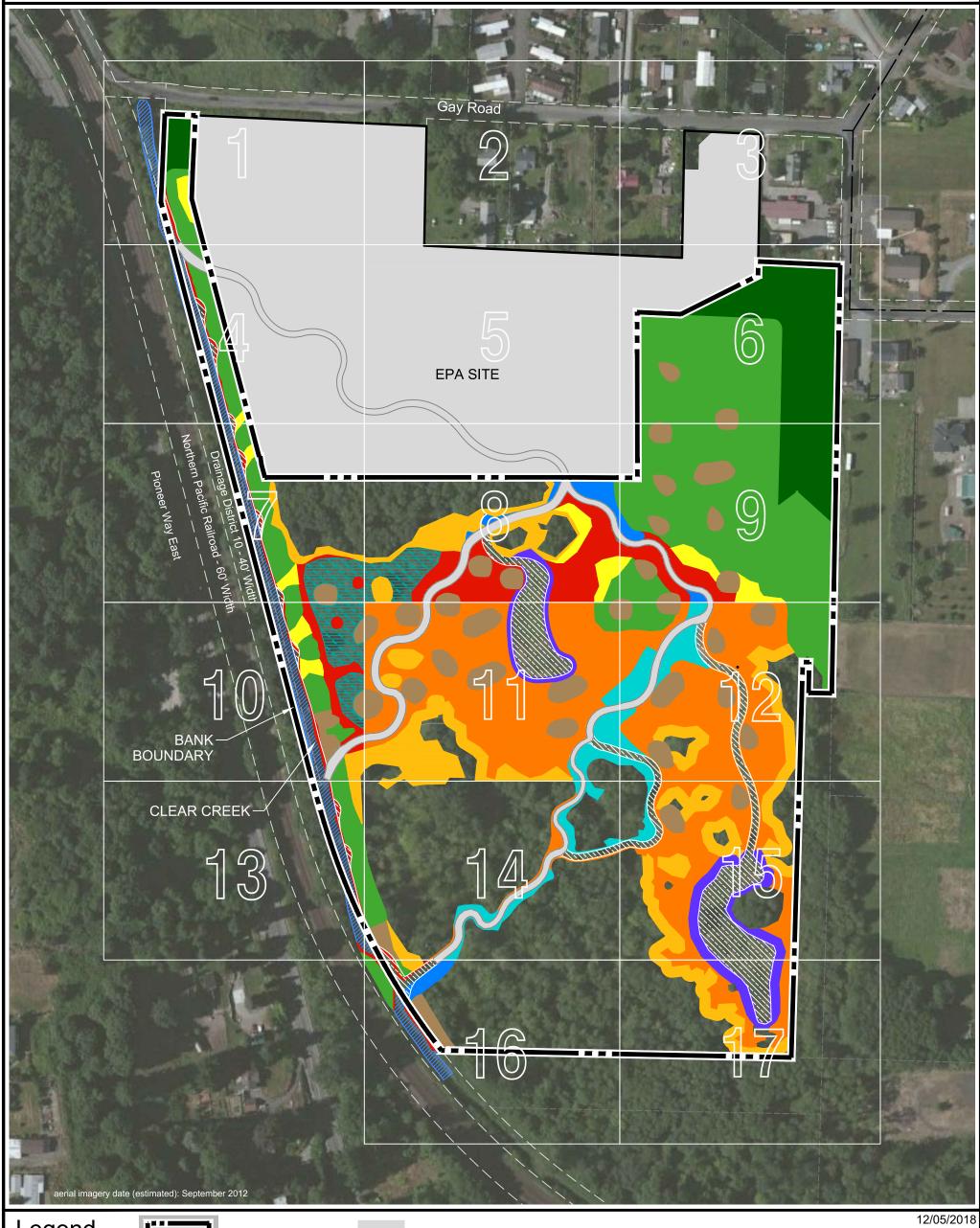
07/13/2016



Figure B7: Planting Plan

Note: The locations of all features shown are approximate. This Figure is for informational purposes only and is intended to assist in showing features discussed in the attached document. Neither the Port of Tacoma nor any of it's staff or consultants makes any warranty of any kind for this information, express or implied, including but not limited to to any warranties or merchantability or fitness for a particular purpose, nor shall the distribution of this information constitute any warranty.





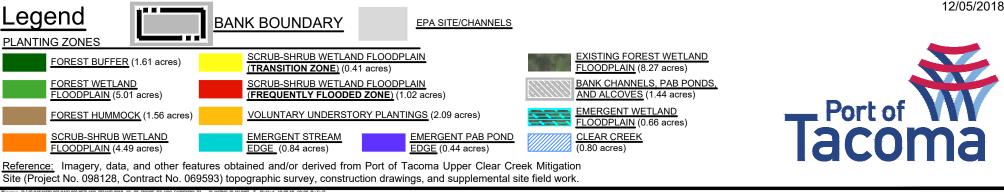
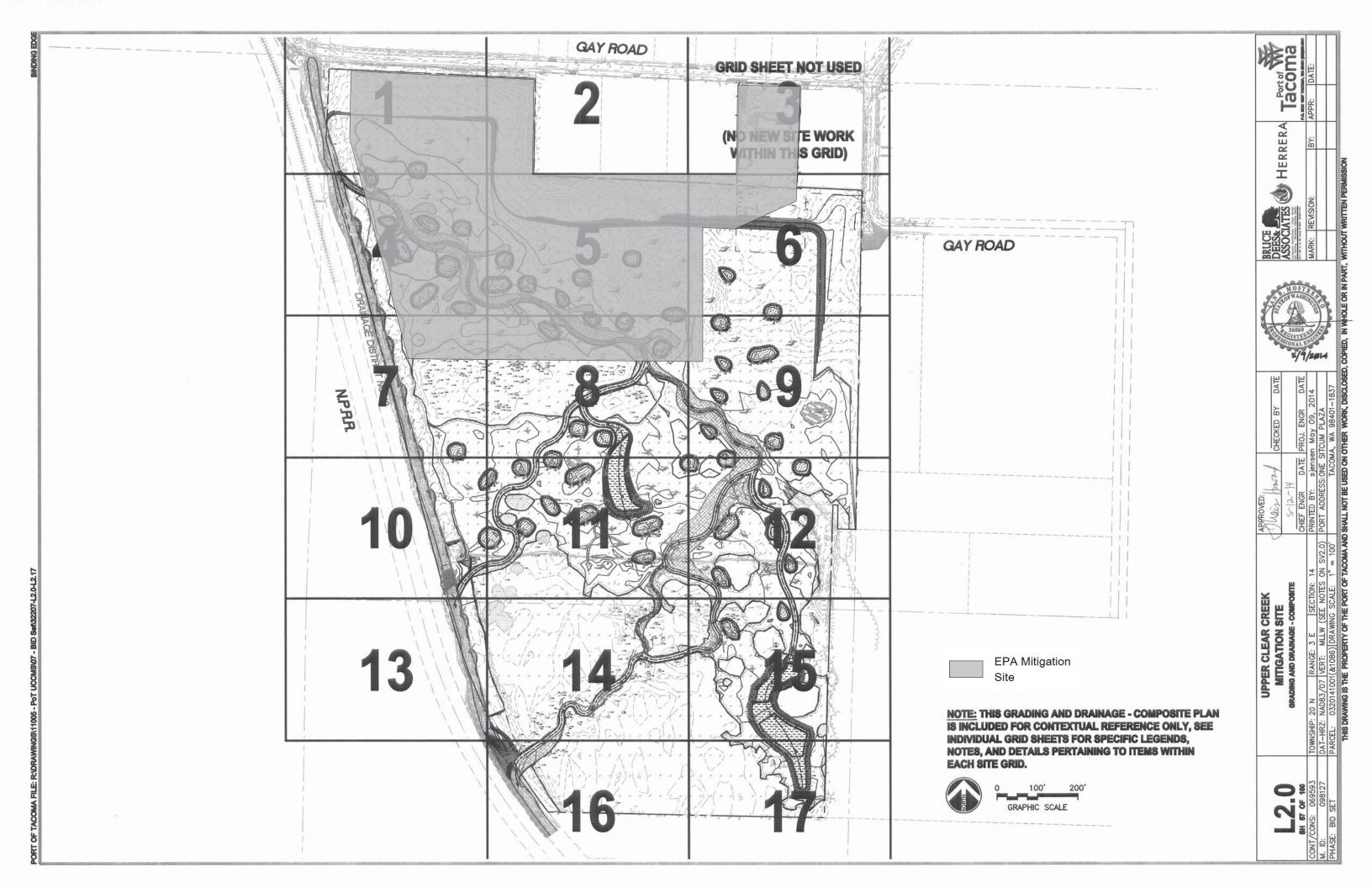
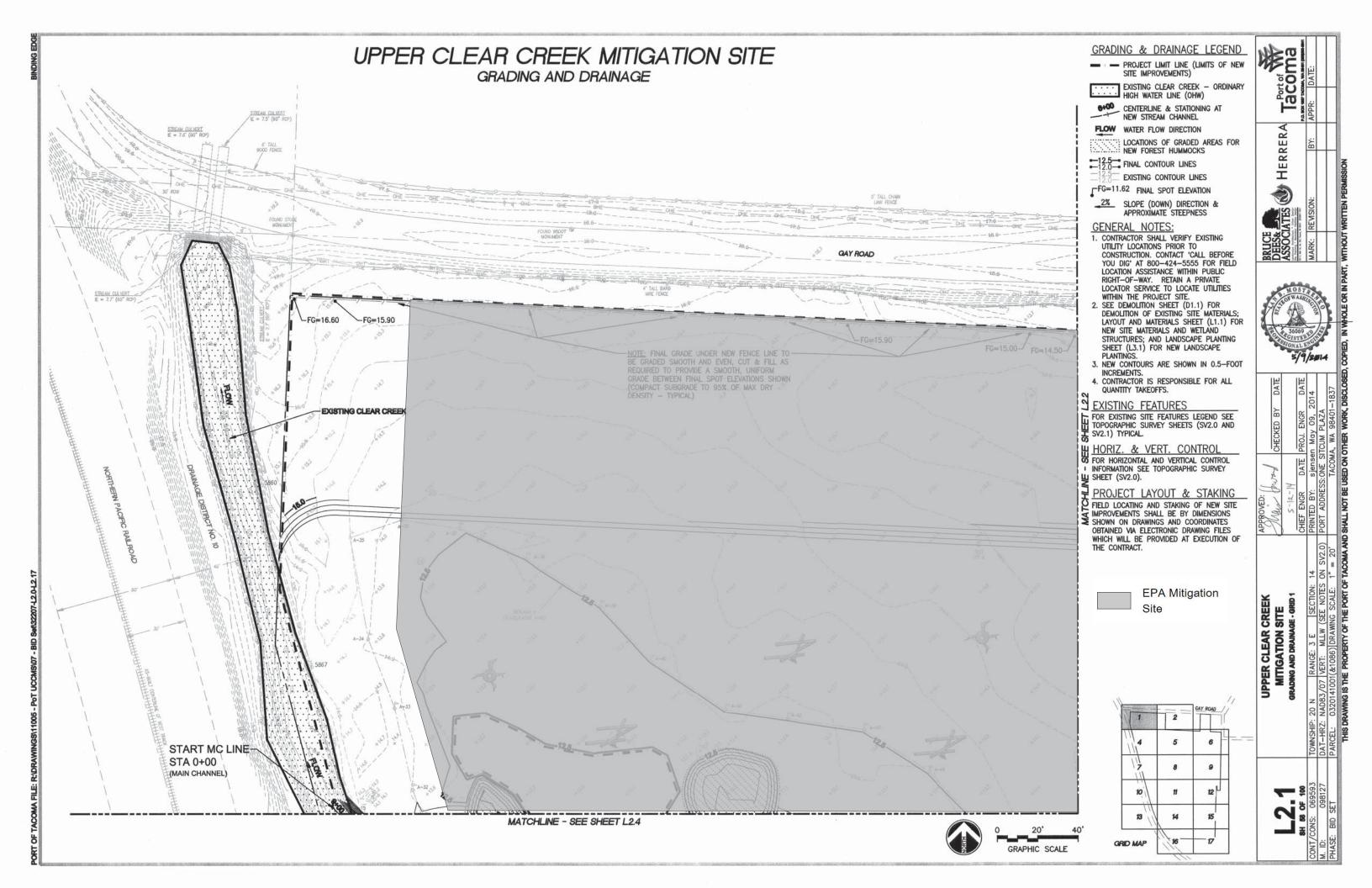


EXHIBIT B1Grading and Drainage Plans





- PROJECT LIMIT LINE (LIMITS OF NEW SITE IMPROVEMENTS)

· · EXISTING CLEAR CREEK - ORDINARY HIGH WATER LINE (OHW)

CENTERLINE & STATIONING AT NEW STREAM CHANNEL

FLOW WATER FLOW DIRECTION

| LOCATIONS OF GRADED AREAS FOR LOCATIONS OF STORM

LOCATIONS OF GRADED AREAS FOR NEW CREEK ALCOVES LOCATIONS OF GRADED AREAS FOR NEW MICRODEPRESSIONS

LOCATIONS OF GRADED AREAS FOR NEW FOREST HUMMOCKS

-12.5 FINAL CONTOUR LINES

FG=11.62 FINAL SPOT ELEVATION

2% SLOPE (DOWN) DIRECTION & APPROXIMATE STEEPNESS

GENERAL NOTES:

1. CONTRACTOR SHALL VERIFY EXISTING UTILITY LOCATIONS PRIOR TO CONSTRUCTION. CONTACT 'CALL BEFORE YOU DIG' AT 800-424-5555 FOR FIELD LOCATION ASSISTANCE WITHIN PUBLIC RIGHT-OF-WAY. RETAIN A PRIVATE LOCATOR SERVICE TO LOCATE UTILITIES WITHIN THE PROJECT SITE.

2. SEE DEMOLITION SHEET (D1.4) FOR DEMOLITION OF EXISTING SITE MATERIALS; LAYOUT AND MATERIALS SHEET (L1.4) FOR NEW SITE MATERIALS AND WETLAND STRUCTURES; AND LANDSCAPE PLANTING SHEET (L3.4) FOR NEW LANDSCAPE PLANTINGS.

3. NEW CONTOURS ARE SHOWN IN 0.5-FOOT

INCREMENTS.
4. CONTRACTOR IS RESPONSIBLE FOR ALL QUANTITY TAKEOFFS.

EXISTING FEATURES

FOR EXISTING SITE FEATURES LEGEND SEE TOPOGRAPHIC SURVEY SHEETS (SV2.0 AND SV2.4) TYPICAL

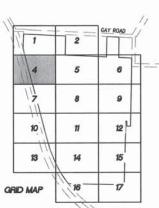
HORIZ. & VERT. CONTROL

FOR HORIZONTAL AND VERTICAL CONTROL INFORMATION SEE TOPOGRAPHIC SURVEY

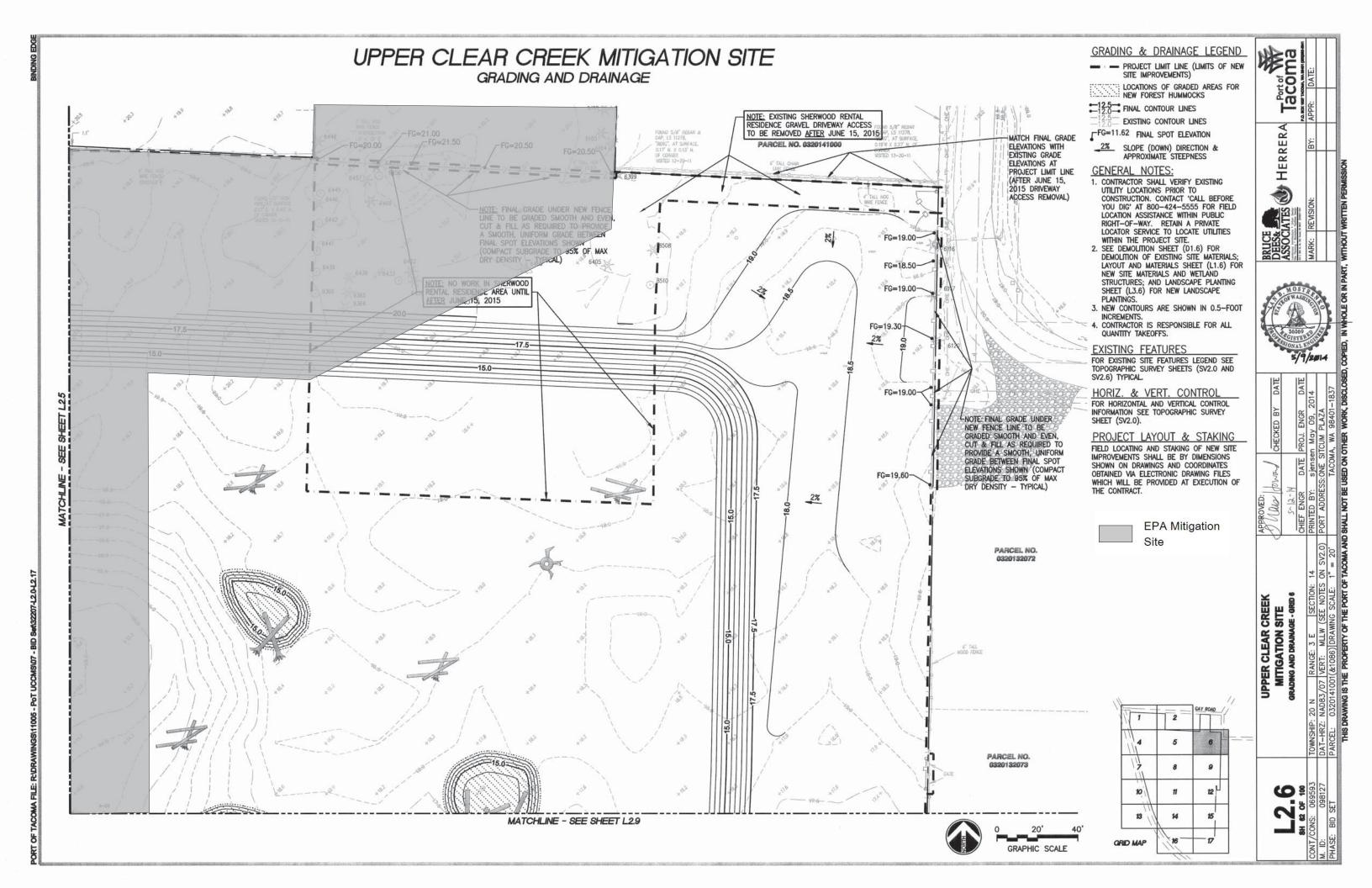
PROJECT LAYOUT & STAKING

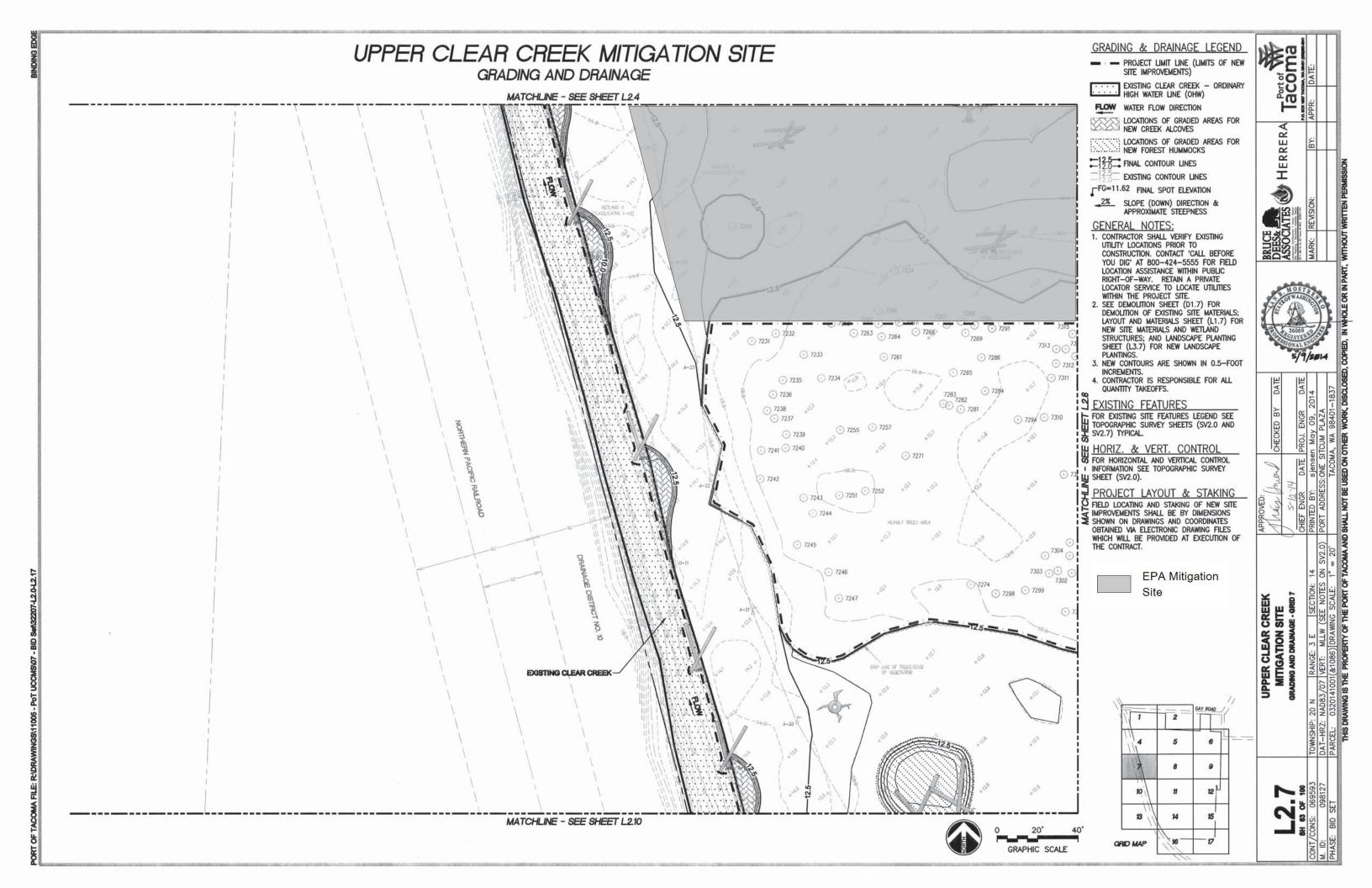
FIELD LOCATING AND STAKING OF NEW SITE IMPROVEMENTS SHALL BE BY DIMENSIONS SHOWN ON DRAWINGS AND COORDINATES OBTAINED VIA ELECTRONIC DRAWING FILES WHICH WILL BE PROVIDED AT EXECUTION OF

EPA Mitigation



GRAPHIC SCALE





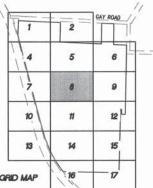
- PROJECT LIMIT LINE (LIMITS OF NEW

CONSTRUCTION. CONTACT 'CALL BEFORE YOU DIG' AT 800-424-5555 FOR FIELD

DEMOLITION OF EXISTING SITE MATERIALS; LAYOUT AND MATERIALS SHEET (L1.8) FOR STRUCTURES; AND LANDSCAPE PLANTING

TOPOGRAPHIC SURVEY SHEETS (SV2.0 AND

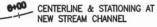
PROJECT LAYOUT & STAKING FIELD LOCATING AND STAKING OF NEW SITE



HERRER.



- PROJECT LIMIT LINE (LIMITS OF NEW



FLOW WATER FLOW DIRECTION

LOCATIONS OF GRADED AREAS FOR NEW CREEK BENCHES

LOCATIONS OF GRADED AREAS FOR NEW FOREST HUMMOCKS

LOCATIONS OF GRADED AREAS AT FILLED DEPRESSIONS

-12.5 FINAL CONTOUR LINES EXISTING CONTOUR LINES

¬FG=11.62 FINAL SPOT ELEVATION

2% SLOPE (DOWN) DIRECTION & APPROXIMATE STEEPNESS

GENERAL NOTES:

- CONTRACTOR SHALL VERIFY EXISTING UTILITY LOCATIONS PRIOR TO CONSTRUCTION. CONTACT 'CALL BEFORE YOU DIG' AT 800-424-5555 FOR FIELD LOCATION ASSISTANCE WITHIN PUBLIC RIGHT-OF-WAY. RETAIN A PRIVATE LOCATOR SERVICE TO LOCATE UTILITIES WITHIN THE PROJECT SITE.
- 2. SEE DEMOLITION SHEET (D1.9) FOR DEMOLITION OF EXISTING SITE MATERIALS; LAYOUT AND MATERIALS SHEET (L1.9) FOR NEW SITE MATERIALS AND WETLAND STRUCTURES; AND LANDSCAPE PLANTING SHEET (L3.9) FOR NEW LANDSCAPE
- 3. NEW CONTOURS ARE SHOWN IN 0.5-FOOT
- INCREMENTS.
 4. CONTRACTOR IS RESPONSIBLE FOR ALL QUANTITY TAKEOFFS.

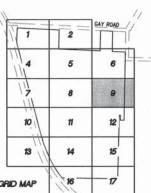
EXISTING FEATURES
FOR EXISTING SITE FEATURES LEGEND SEE
TOPOGRAPHIC SURVEY SHEETS (SV2.0 AND SV2.9) TYPICAL.

HORIZ. & VERT. CONTROL FOR HORIZONTAL AND VERTICAL CONTROL INFORMATION SEE TOPOGRAPHIC SURVEY SHEET (SV2.0).

PROJECT LAYOUT & STAKING

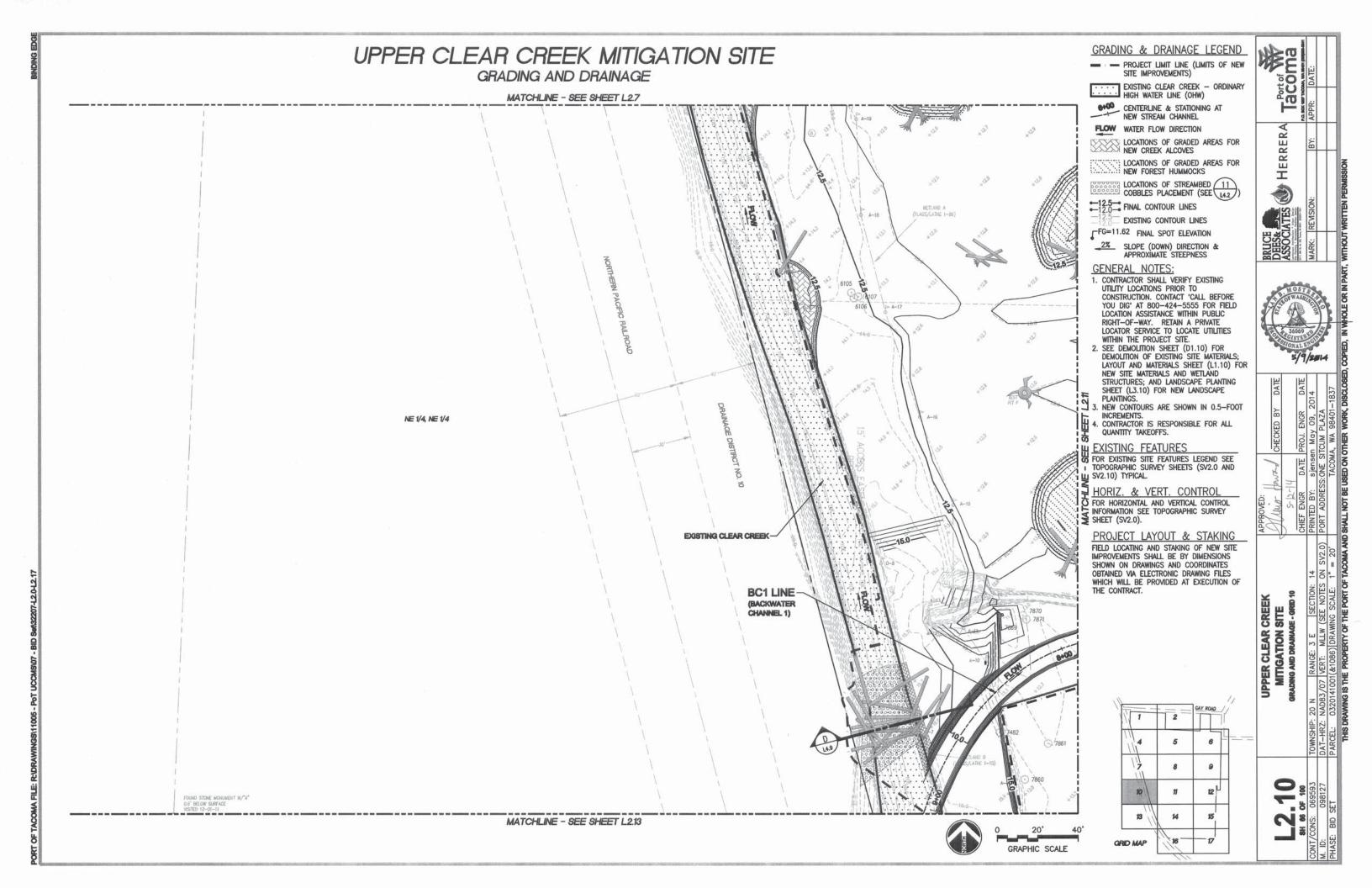
FIELD LOCATING AND STAKING OF NEW SITE IMPROVEMENTS SHALL BE BY DIMENSIONS SHOWN ON DRAWINGS AND COORDINATES OBTAINED VIA ELECTRONIC DRAWING FILES WHICH WILL BE PROVIDED AT EXECUTION OF

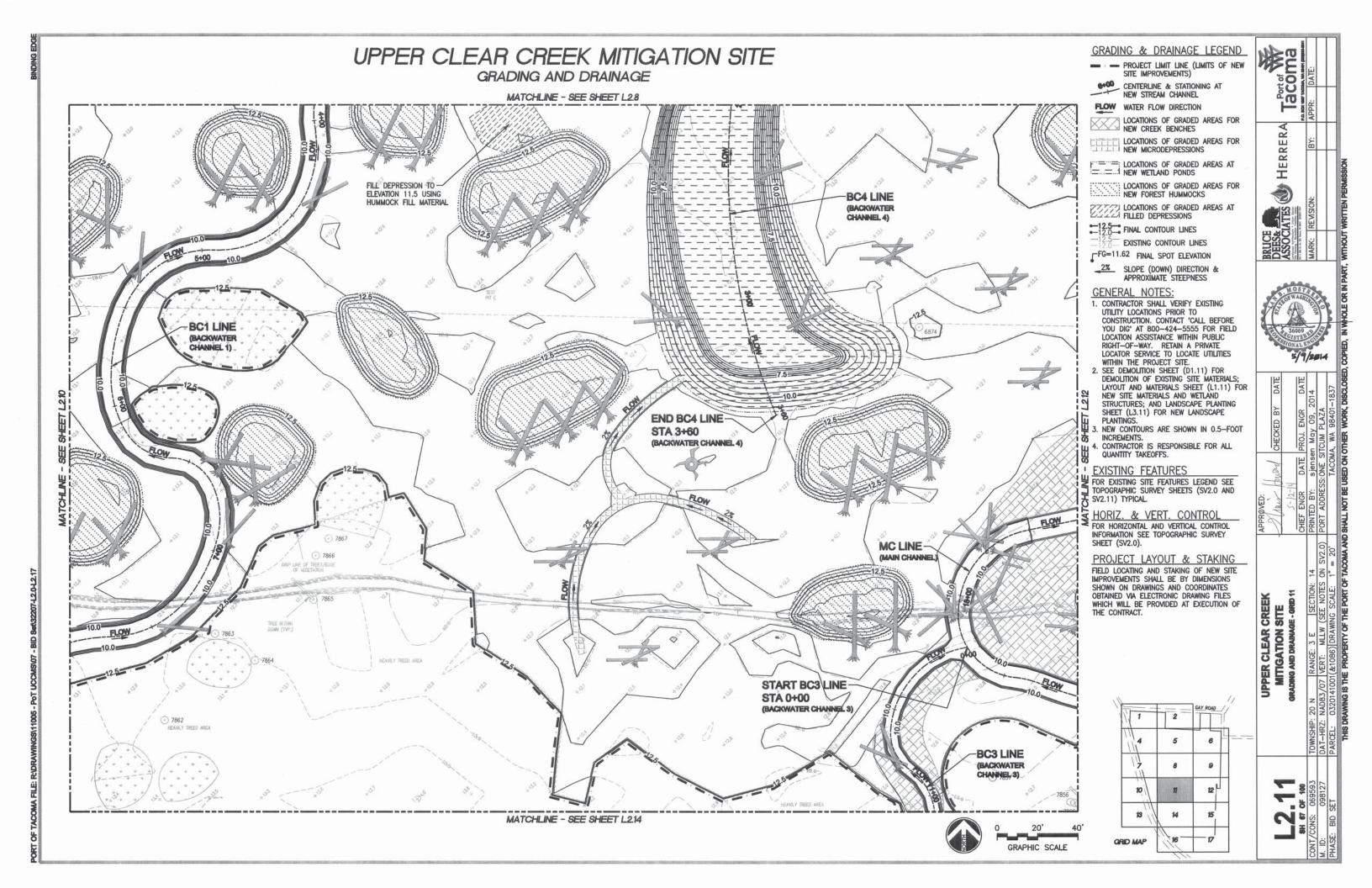
EPA Mitigation

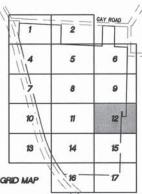


GRAPHIC SCALE





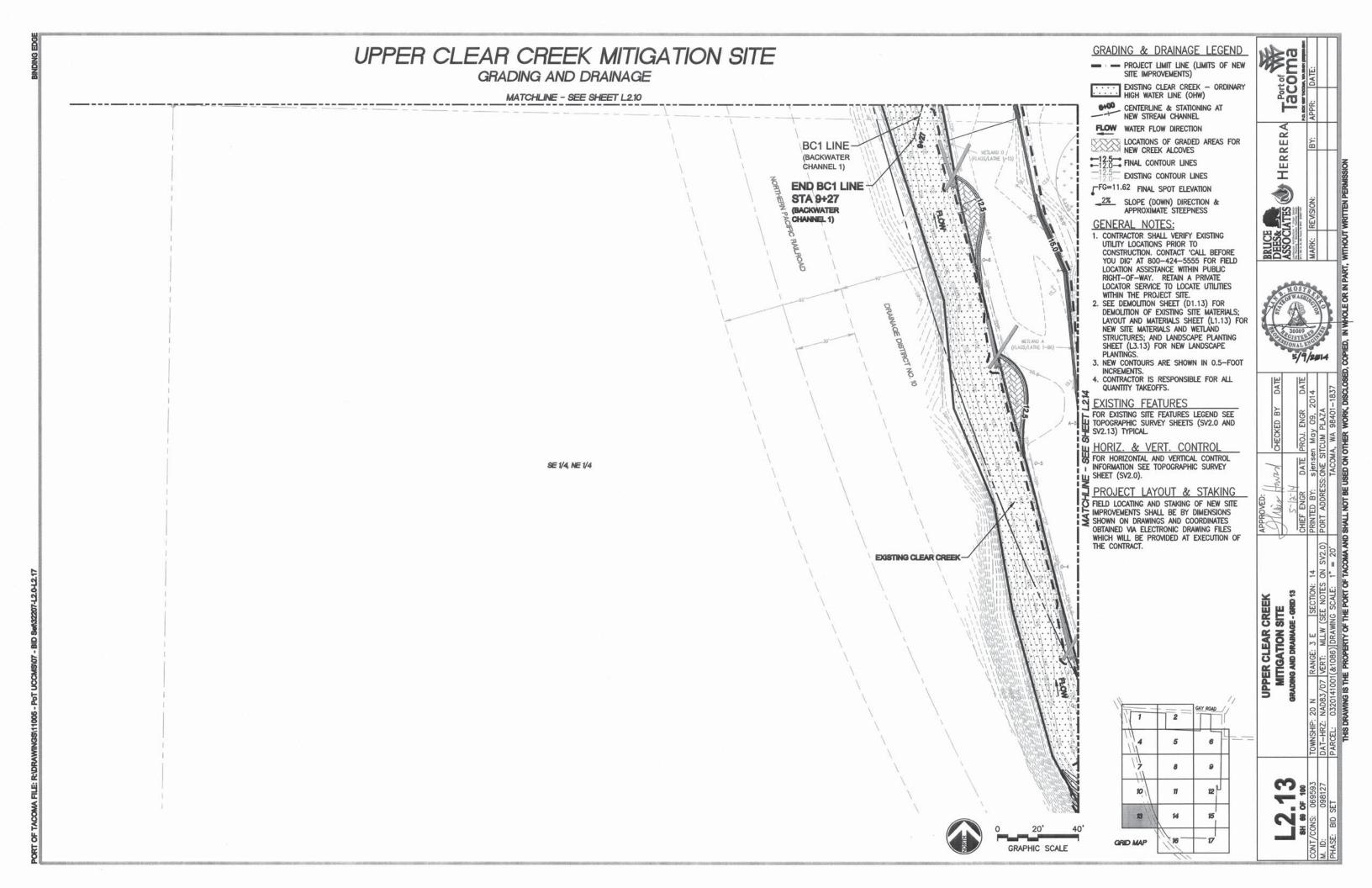


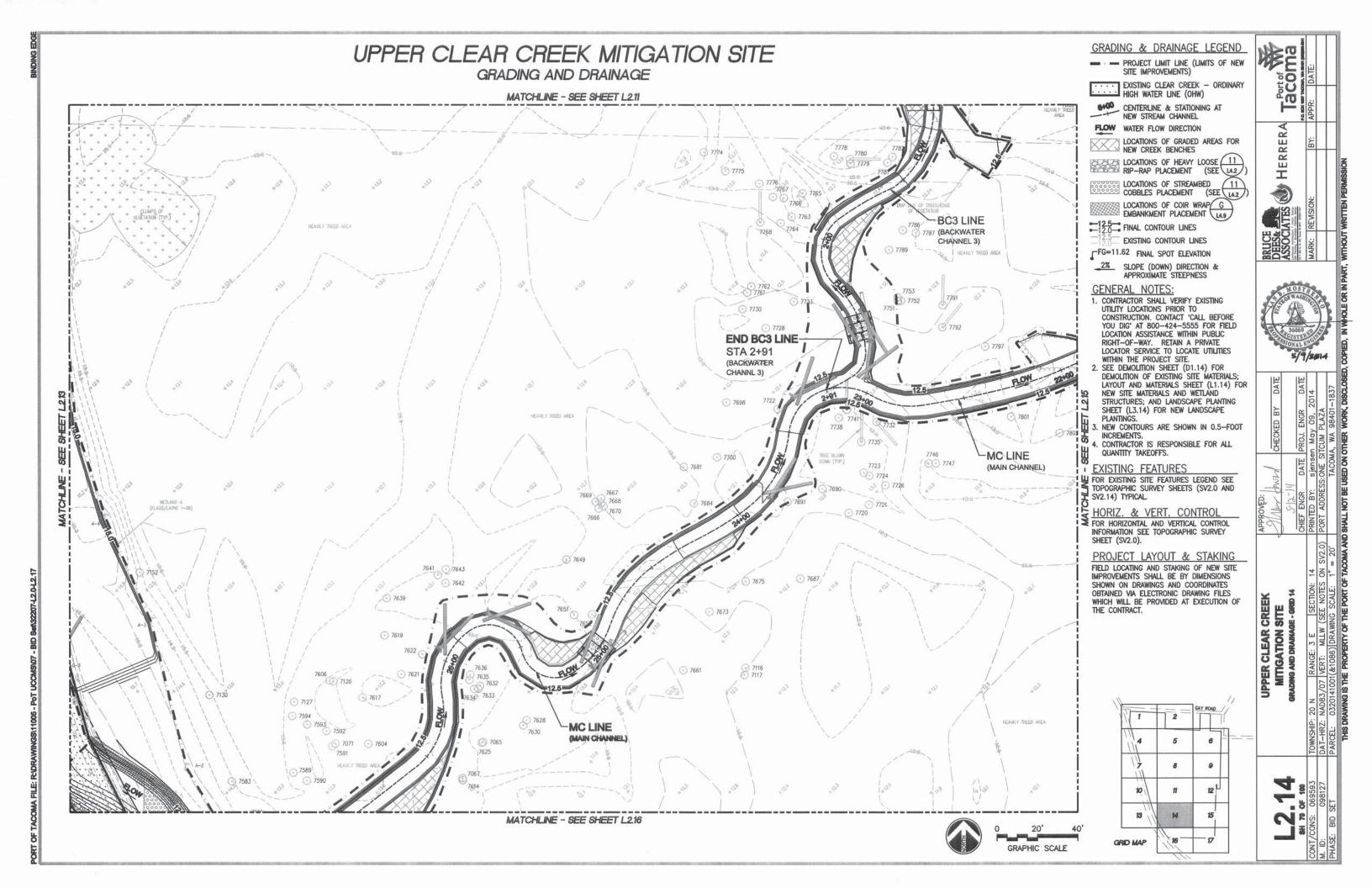


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- PROJECT LIMIT LINE (LIMITS OF NEW SITE IMPROVEMENTS)



FLOW WATER FLOW DIRECTION

LOCATIONS OF GRADED AREAS FOR NEW CREEK BENCHES

F"=" LOCATIONS OF GRADED AREAS AT =...=...i NEW WETLAND PONDS

> LOCATIONS OF GRADED AREAS FOR NEW FOREST HUMMOCKS

-12.5 FINAL CONTOUR LINES EXISTING CONTOUR LINES

FG=11.62 FINAL SPOT ELEVATION

2% SLOPE (DOWN) DIRECTION & APPROXIMATE STEEPNESS

GENERAL NOTES:

- CONTRACTOR SHALL VERIFY EXISTING UTILITY LOCATIONS PRIOR TO CONSTRUCTION. CONTACT 'CALL BEFORE YOU DIG' AT 800-424-5555 FOR FIELD LOCATION ASSISTANCE WITHIN PUBLIC RIGHT-OF-WAY. RETAIN A PRIVATE LOCATOR SERVICE TO LOCATE UTILITIES WITHIN THE PROJECT SITE.
- 2. SEE DEMOLITION SHEET (D1.15) FOR DEMOLITION OF EXISTING SITE MATERIALS; LAYOUT AND MATERIALS SHEET (L1.15) FOR NEW SITE MATERIALS AND WETLAND STRUCTURES; AND LANDSCAPE PLANTING SHEET (L3.15) FOR NEW LANDSCAPE PLANTINGS.
- 3. NEW CONTOURS ARE SHOWN IN 0.5-FOOT
- 4. CONTRACTOR IS RESPONSIBLE FOR ALL QUANTITY TAKEOFFS.

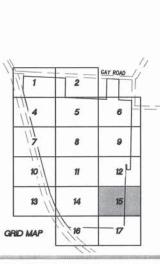
EXISTING FEATURES

FOR EXISTING SITE FEATURES LEGEND SEE TOPOGRAPHIC SURVEY SHEETS (SV2.0 AND

HORIZ. & VERT. CONTROL
FOR HORIZONTAL AND VERTICAL CONTROL
INFORMATION SEE TOPOGRAPHIC SURVEY
SHEET (SV2.0).

PROJECT LAYOUT & STAKING

FIELD LOCATING AND STAKING OF NEW SITE IMPROVEMENTS SHALL BE BY DIMENSIONS SHOWN ON DRAWINGS AND COORDINATES OBTAINED VIA ELECTRONIC DRAWING FILES WHICH WILL BE PROVIDED AT EXECUTION OF



GRAPHIC SCALE



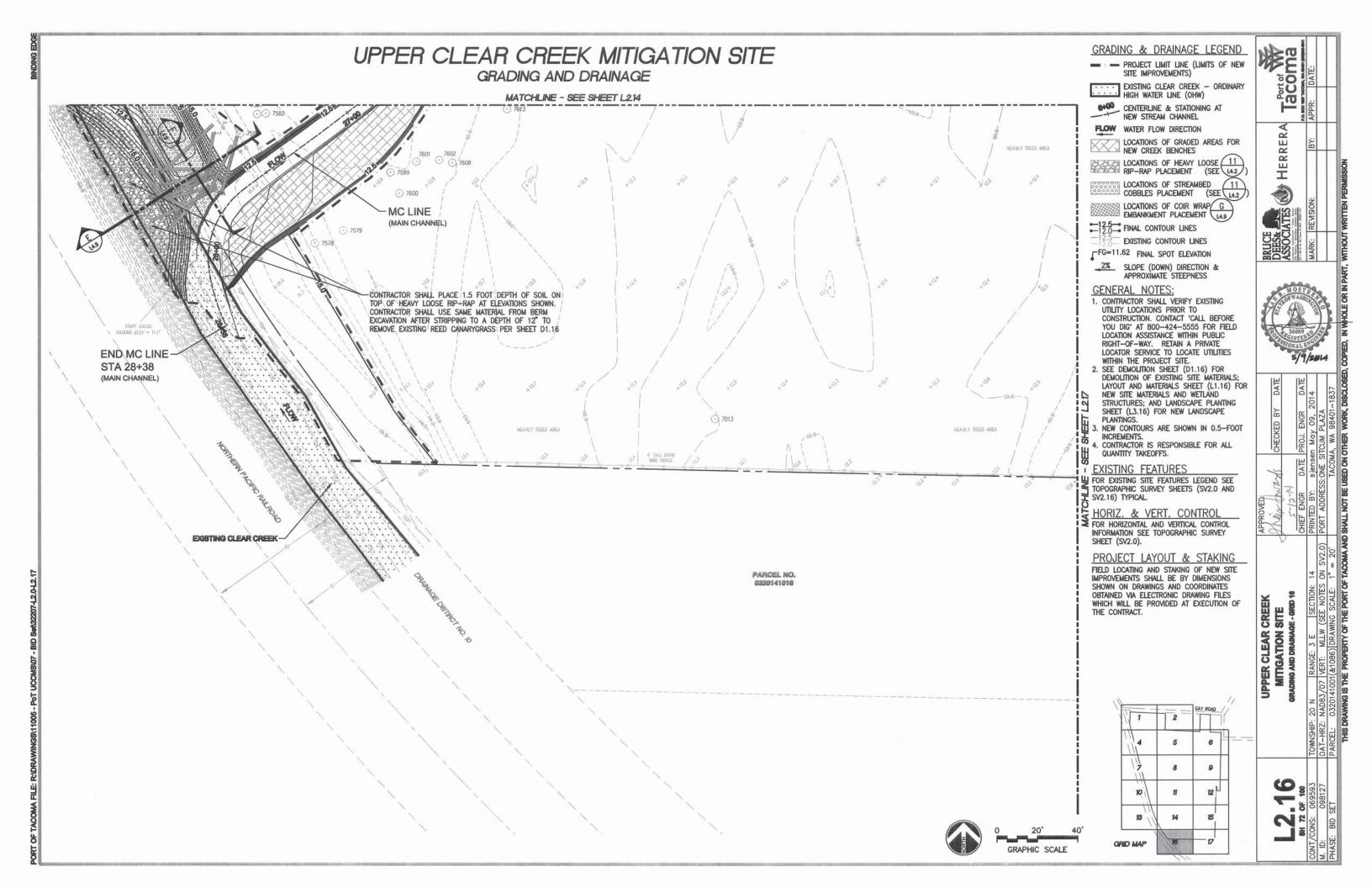
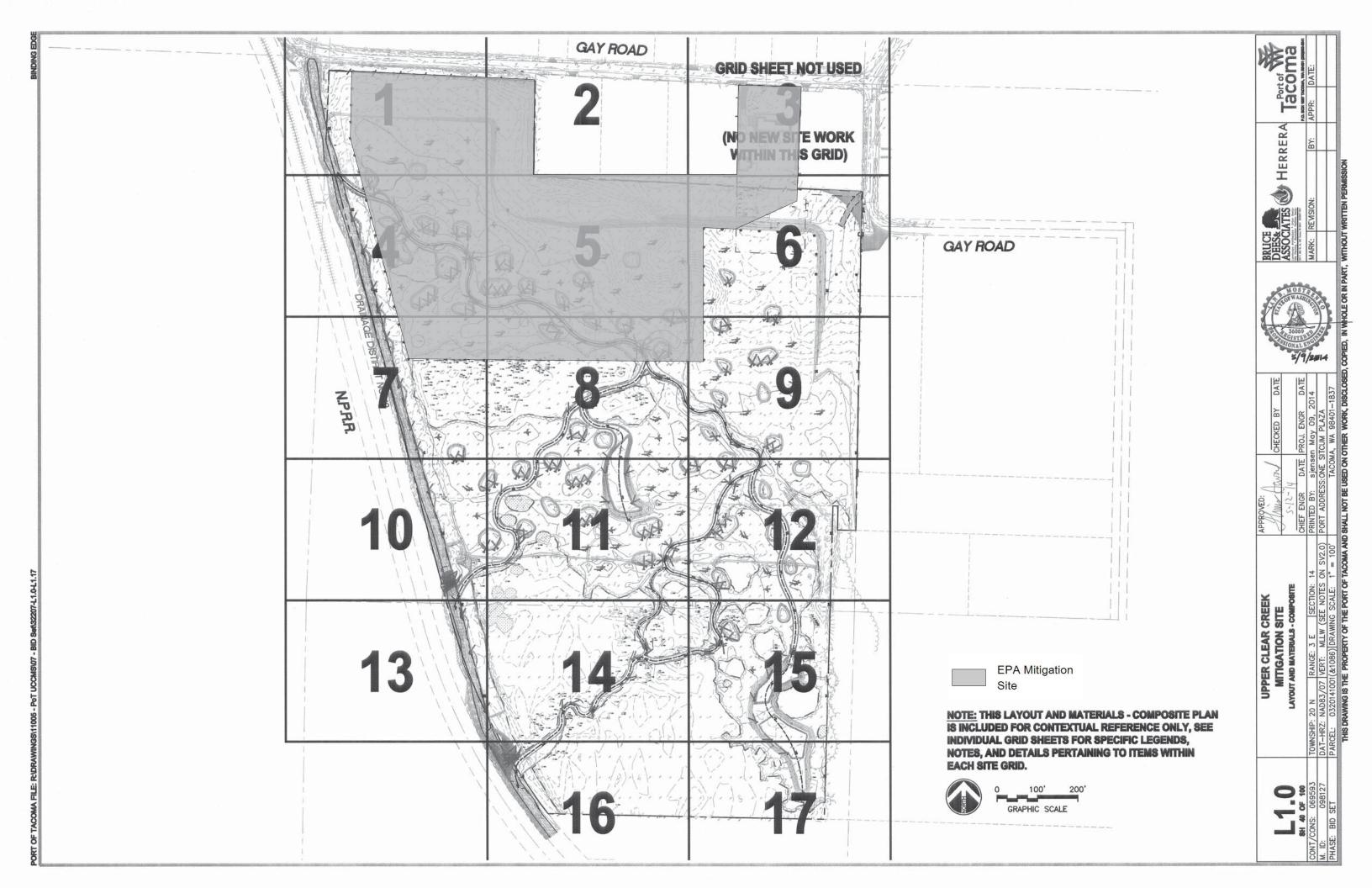
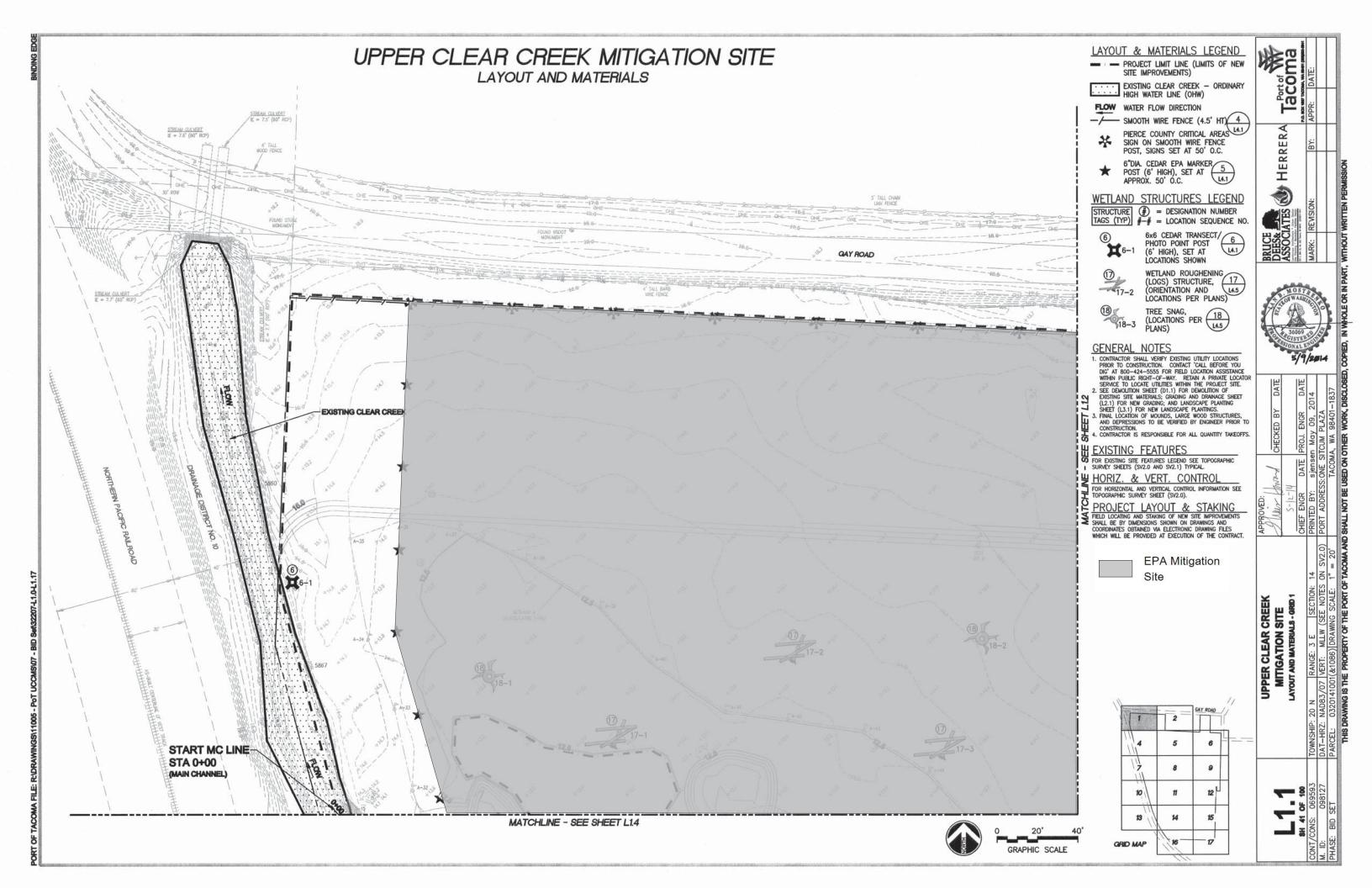
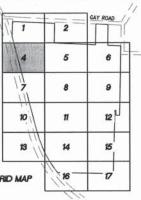
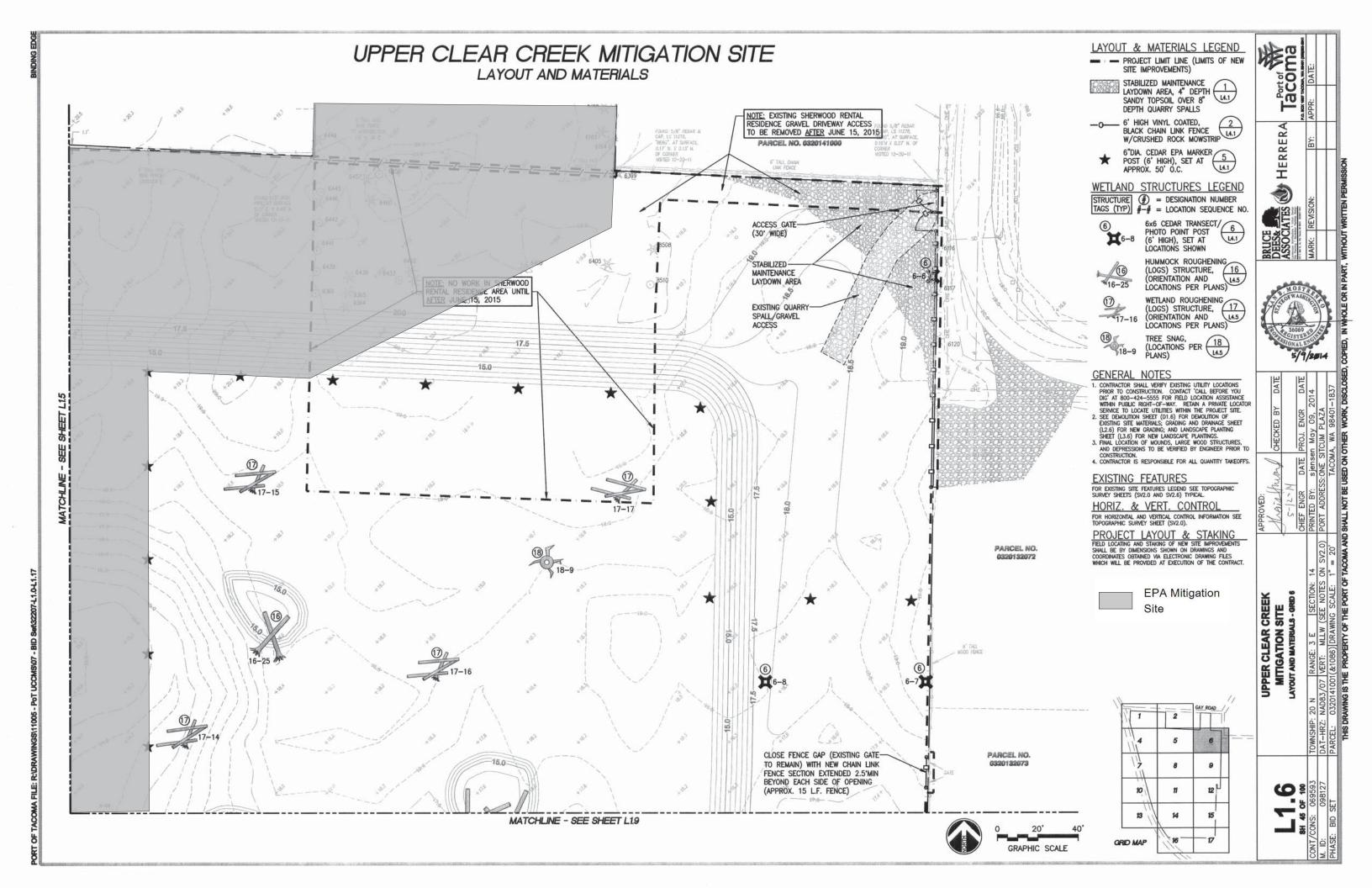


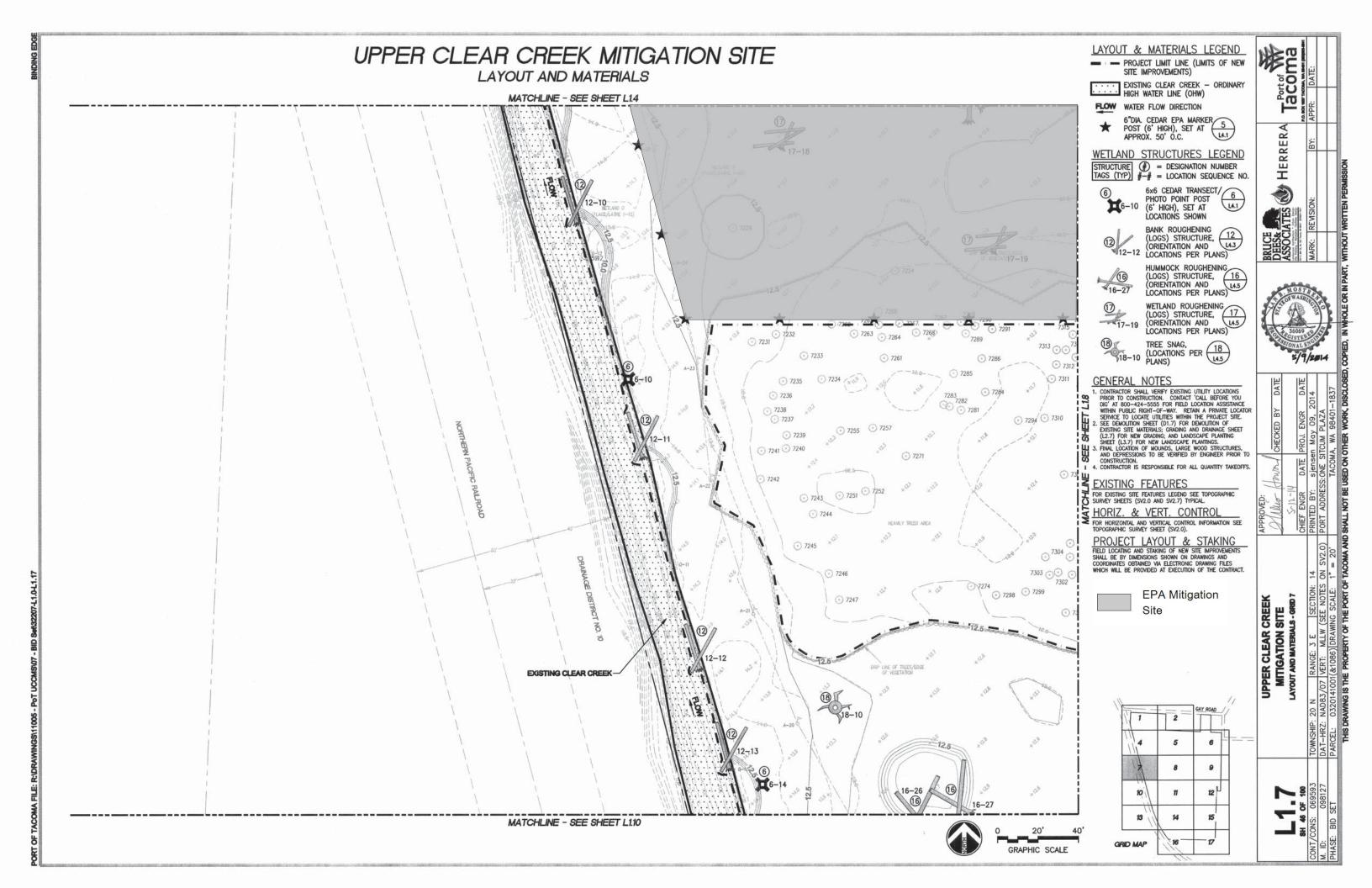
EXHIBIT B2Restoration Plan Detail Sheets











- PROJECT LIMIT LINE (LIMITS OF NEW SITE IMPROVEMENTS)

CENTERLINE & STATIONING AT NEW STREAM CHANNEL

FLOW WATER FLOW DIRECTION

6"DIA. CEDAR EPA MARKER
6"DIA. CEDAR EPA MARKER
6
LA1

WETLAND STRUCTURES LEGEND STRUCTURE # = DESIGNATION NUMBER TAGS (TYP) #-# = LOCATION SEQUENCE NO.



6x6 CEDAR TRANSECT/ PHOTO POINT POST (6' HIGH), SET AT LOCATIONS SHOWN

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BANK ROUGHENING 12 (ORIENTATION AND LOCATIONS PER PLANS)



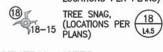
COBBLE STRUCTURE, (ORIENTATION AND LOCATIONS PER PLANS)



(LOGS) STRUCTURE, (ORIENTATION AND LOCATIONS PER PLANS) (LOGS) STRUCTURE, (ORIENTATION AND LOCATIONS PER PL WETLAND ROUGHENING (LOGS) STRUCTURE, (ORIENTATION AND



LOCATIONS PER PLANS)



GENERAL NOTES

- GENERAL NOTES

 1. CONTRACTOR SHALL VERIFY EXISTING UTILITY LOCATIONS PRIOR TO CONSTRUCTION. CONTACT "CALL BEFORE YOU DIG" AT 800—424—5555 FOR FIELD LOCATION ASSISTANCE WITHIN PUBLIC RIGHT—OF—WAY. RETAIN A PRIVATE LOCATOR SERVICE TO LOCATE UTILITIES WITHIN THE PROJECT SITE.

 2. SEE DEMOLITION SHEET (0.19) FOR DEMOLITION OF EXISTING SITE MATERIALS; GRADING AND DRAINAGE SHEET (12.9) FOR NEW GRADING; AND LANDSCAPE PLANTING SHEET (13.9) FOR NEW LANDSCAPE PLANTING SHEET (13.9) FOR NEW LANDSCAPE PLANTING.

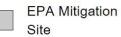
 3. FINAL LOCATION OF MOUNDS, LARGE WOOD STRUCTURES, AND DEPRESSIONS TO BE VERIFIED BY ENGINEER PRIOR TO CONSTRUCTION.
- CONSTRUCTION.
 4. CONTRACTOR IS RESPONSIBLE FOR ALL QUANTITY TAKEOFFS.

EXISTING FEATURES

FOR EXISTING SITE FEATURES LEGEND SEE TOPOGRAPHIC SURVEY SHEETS (SV2.0 AND SV2.9) TYPICAL.

HORIZ. & VERT. CONTROL

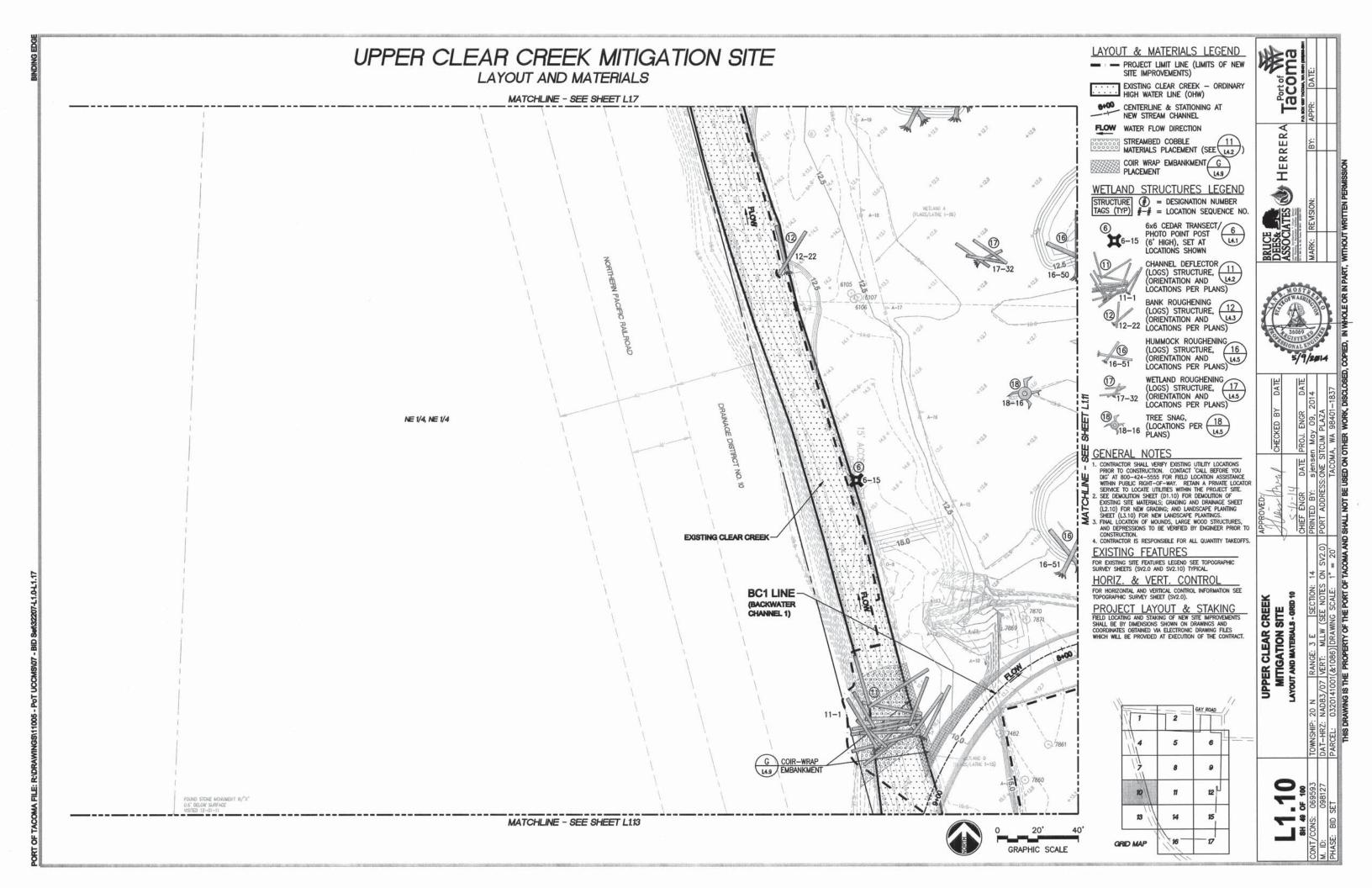
FOR HORIZONTAL AND VERTICAL CONTROL INFORMATION SEE TOPOGRAPHIC SURVEY SHEET (SV2.0).

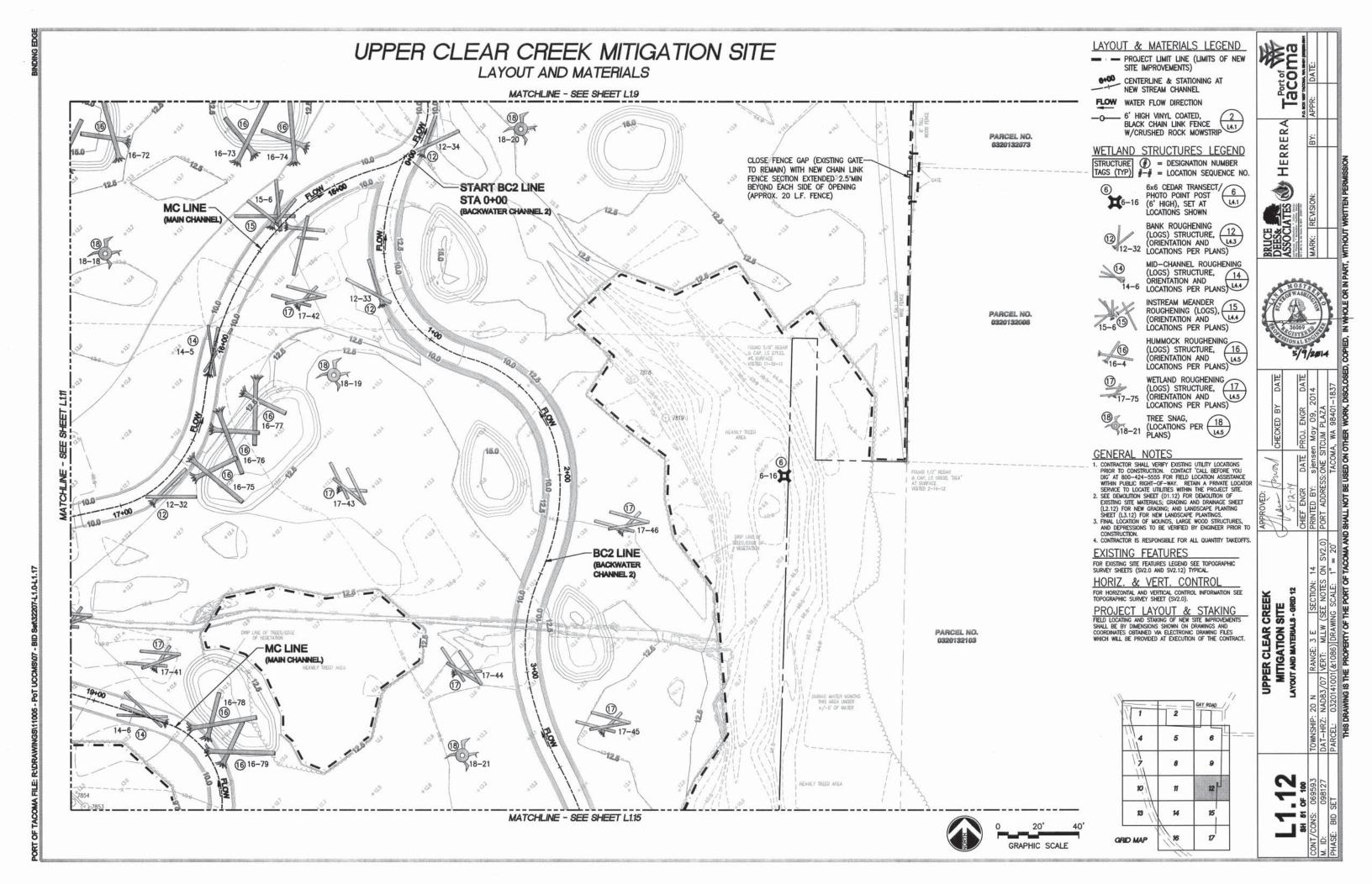


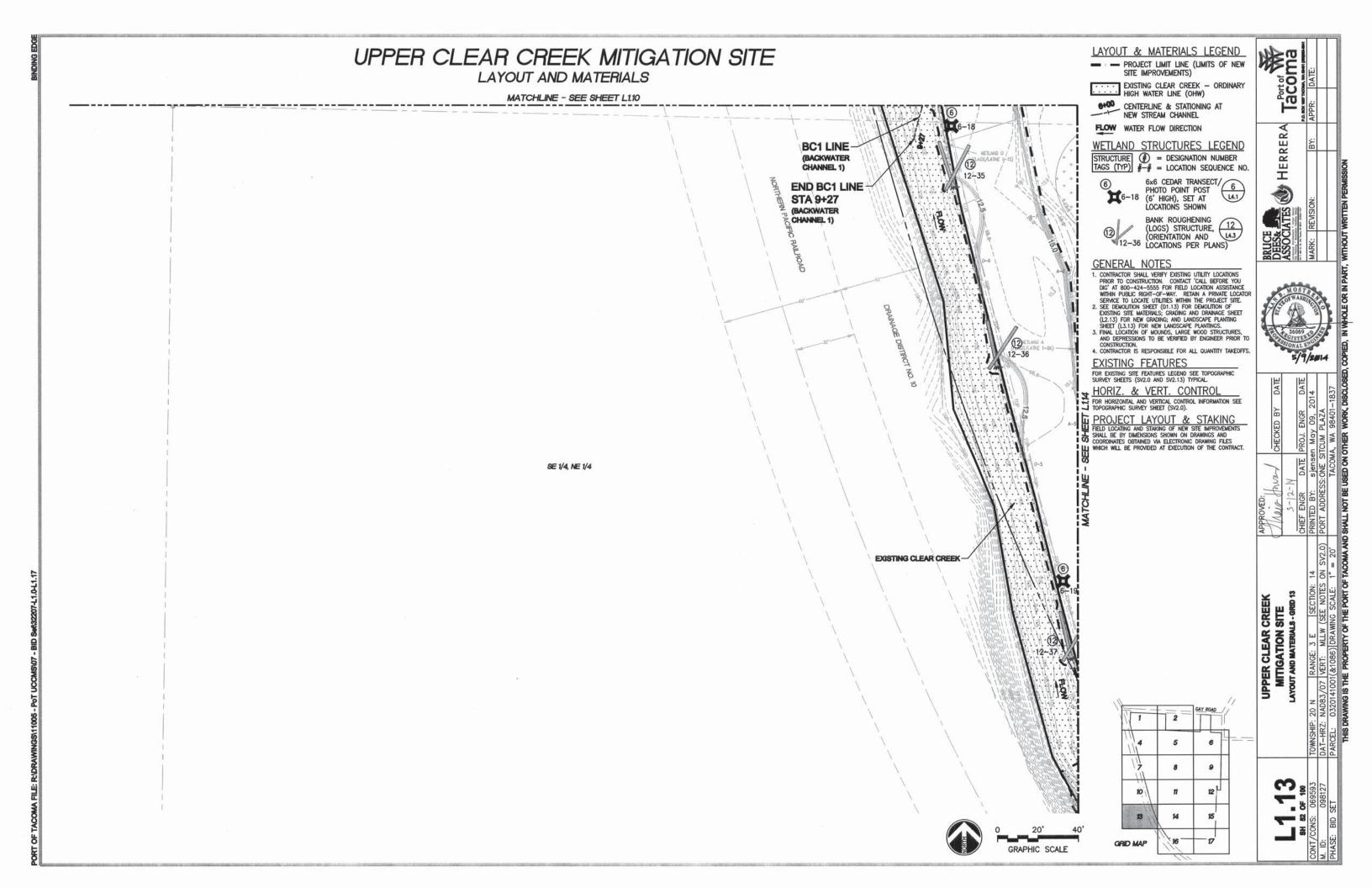


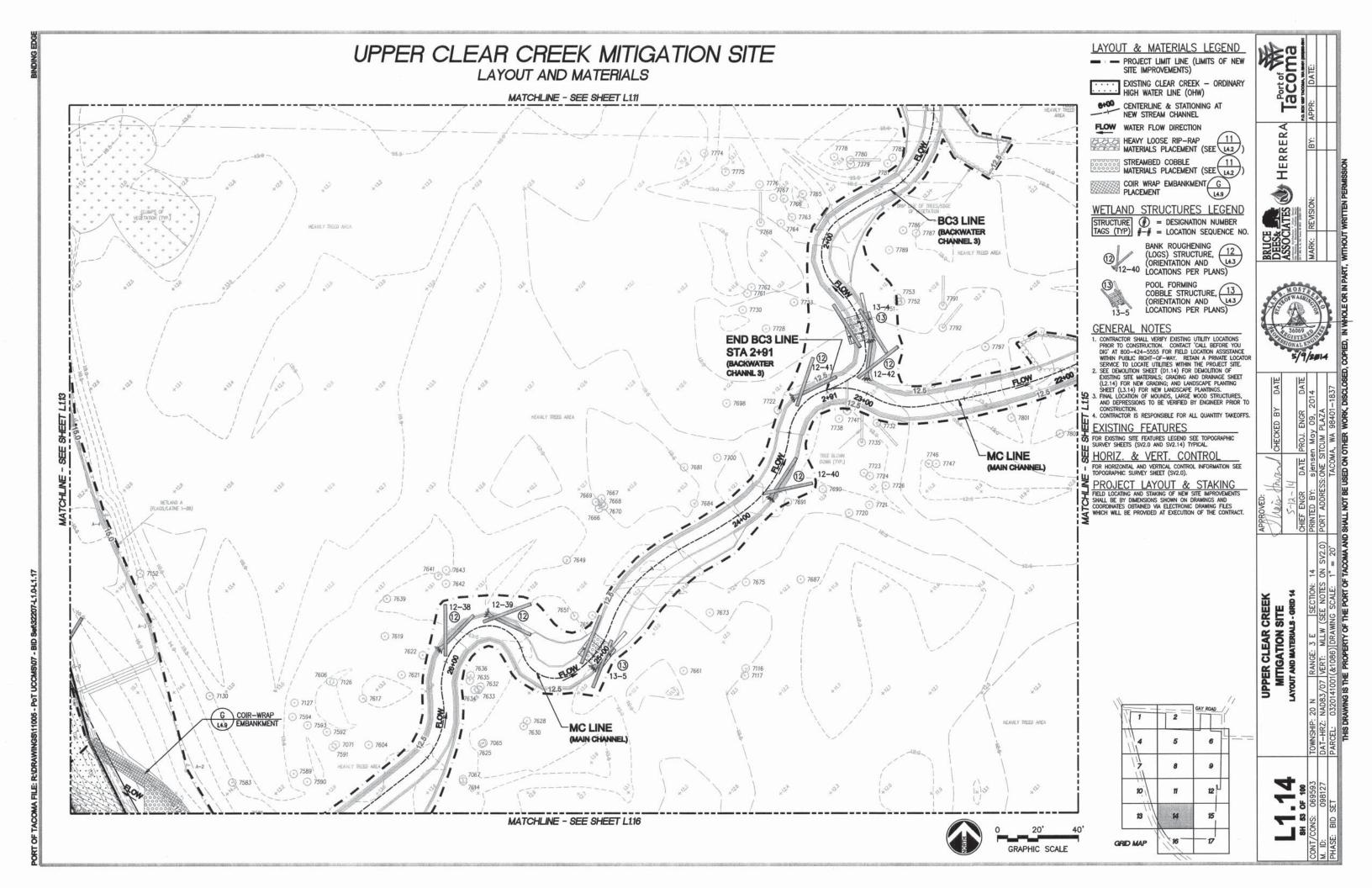
GRAPHIC SCALE

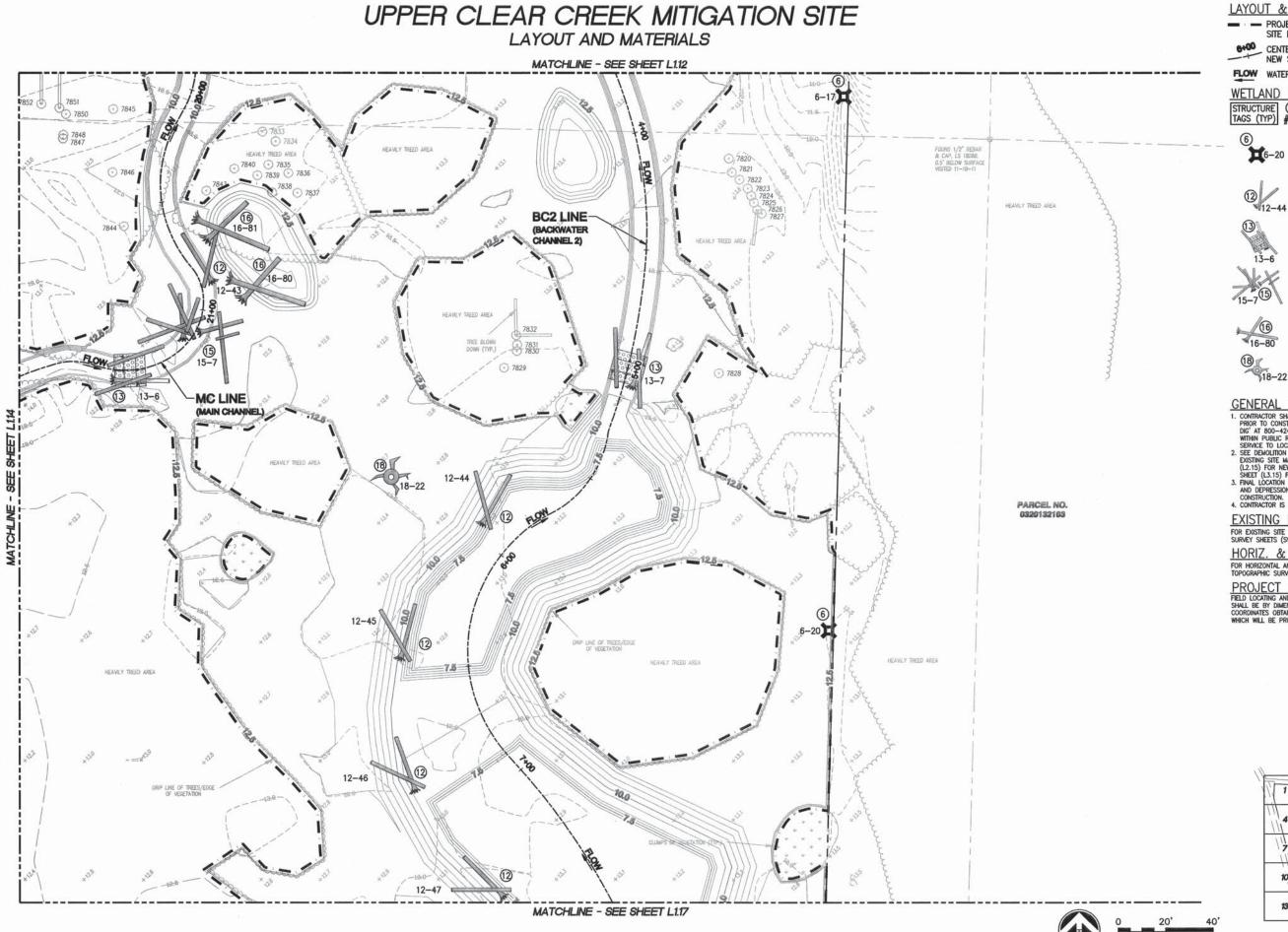
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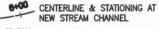








- PROJECT LIMIT LINE (LIMITS OF NEW SITE IMPROVEMENTS)



FLOW WATER FLOW DIRECTION

WETLAND STRUCTURES LEGEND STRUCTURE # = DESIGNATION NUMBER
TAGS (TYP) #-# = LOCATION SEQUENCE NO.

PHOTO POINT POST (6' HIGH), SET AT LOCATIONS SHOWN



BANK ROUGHENING (LOGS) STRUCTURE, (ORIENTATION AND LOCATIONS PER PLANS)

POOL FORMING COBBLE STRUCTURE, 13 (ORIENTATION AND LOCATIONS PER PLANS)



INSTREAM MEANDER ROUGHENING (LOGS), (ORIENTATION AND LOCATIONS PER PLANS) HUMMOCK ROUGHENING



(LOGS) STRUCTURE, (16 (ORIENTATION AND LA.5 LOCATIONS PER PLANS)



TREE SNAG, (LOCATIONS PER (LAS)

GENERAL NOTES

- 1. CONTRACTOR SHALL VERIFY EXISTING UTILITY LOCATIONS PRIOR TO CONSTRUCTION. CONTRACT CALL BEFORE YOU DIG AT 800—424—5555 FOR FIELD LOCATION ASSISTANCE WITHIN PUBLIC RIGHT—OF—WAY. RETAIN A PRIVATE LOCATOR SERVICE TO LOCATE UTILITIES WITHIN THE PROJECT SITE.

 2. SEE DEMOLITION SHEET (D1.15) FOR DEMOLITION OF EXISTING SITE MATERIALS, GRADING AND DRAINAGE SHEET (L2.15) FOR NEW GRADING, AND LANDSCAPE PLANTING SHEET (L3.15) FOR NEW LANDSCAPE PLANTING.

 3. FINAL LOCATION OF MOUNDS, LARGE WOOD STRUCTURES, AND DEPRESSIONS TO BE VERIFIED BY ENGINEER PRIOR TO CONSTRUCTION.
- CONSTRUCTION.
 4. CONTRACTOR IS RESPONSIBLE FOR ALL QUANTITY TAKEOFFS

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HORIZ. & VERT. CONTROL

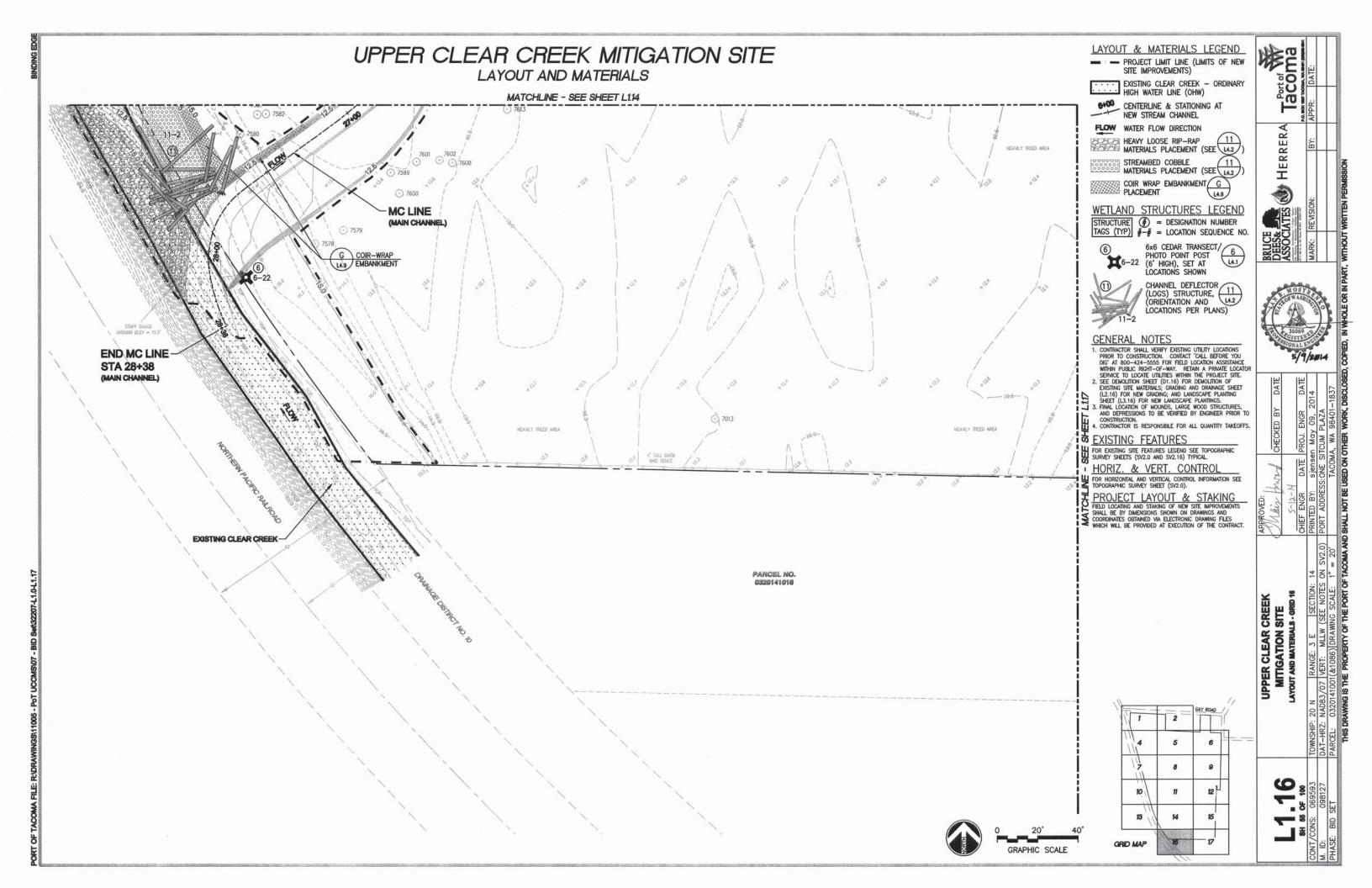
FOR HORIZONTAL AND VERTICAL CONTROL INFORMATION SEE TOPOGRAPHIC SURVEY SHEET (SV2.0).

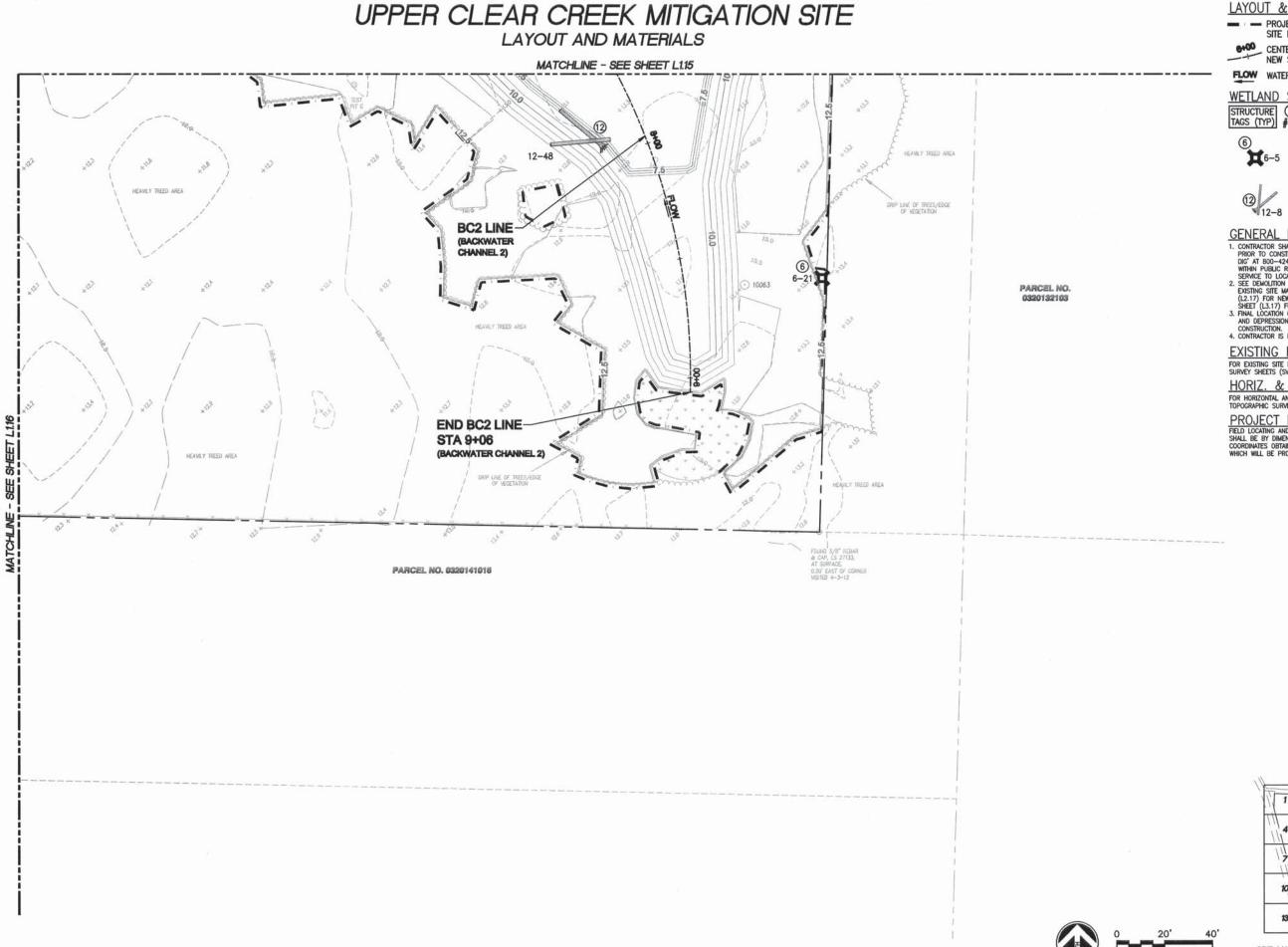
PROJECT LAYOUT & STAKING FIELD LOCATING AND STAKING OF NEW SITE IMPROVEMENTS SHALL BE BY DIMENSIONS SHOWN ON DRAWINGS AND COORDINATES OBTAINED VIA ELECTRONIC DRAWING FILES WHICH WILL BE PROVIDED AT EXECUTION OF THE CONTRACT.

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GRAPHIC SCALE

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- PROJECT LIMIT LINE (LIMITS OF NEW



CENTERLINE & STATIONING AT NEW STREAM CHANNEL

FLOW WATER FLOW DIRECTION

WETLAND STRUCTURES LEGEND

6x6 CEDAR TRANSECT/ PHOTO POINT POST (6' HIGH), SET AT LOCATIONS SHOWN



BANK ROUGHENING 12 (LOGS) STRUCTURE, (ORIENTATION AND 12-8 LOCATIONS PER PLANS)

GENERAL NOTES

- GENERAL NOTES

 1. CONTRACTOR SHALL VERIFY EXISTING UTILITY LOCATIONS PRIOR TO CONSTRUCTION. CONTACT 'CALL BEFORE YOU DIG' AT 800-424-5555 FOR FIELD LOCATION ASSISTANCE WITHIN PUBLIC RICHT-OF-WAY. RETAIN A PRIVATE LOCATOR SERVICE TO LOCATE UTILITIES WITHIN THE PROJECT SITE.

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 4. CONTRACTOR IS RESPONSIBLE FOR ALL QUANTITY TAKEOFFS.

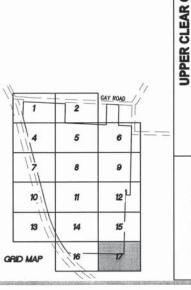
EXISTING FEATURES

FOR EXISTING SITE FEATURES LEGEND SEE TOPOGRAPHIC SURVEY SHEETS (SV2.0 AND SV2.17) TYPICAL

HORIZ. & VERT. CONTROL

FOR HORIZONTAL AND VERTICAL CONTROL INFORMATION SEE TOPOGRAPHIC SURVEY SHEET (SV2.0).

PROJECT LAYOUT & STAKING
FIELD LOCATING AND STAKING OF NEW SITE IMPROVEMENTS
SHALL BE BY DIMENSIONS SHOWN ON DRAWNINGS AND
COORDINATES OBTAINED VIA ELECTRONIC DRAWING FILES
WHICH WILL BE PROVIDED AT EXECUTION OF THE CONTRACT.



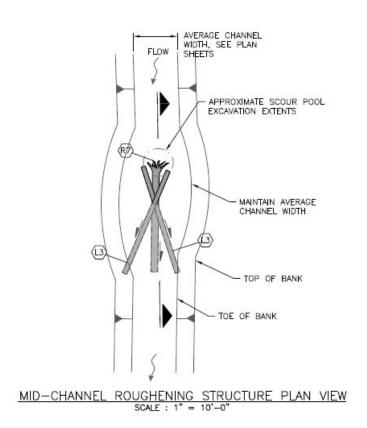
GRAPHIC SCALE

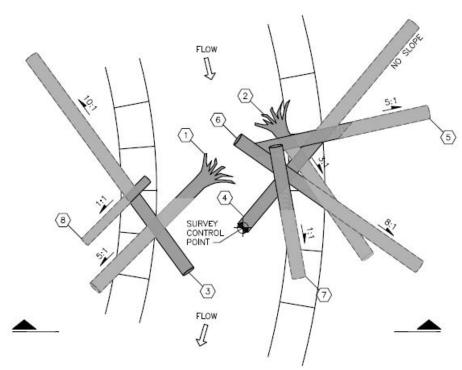
EXHIBIT B3Habitat Features Detail Sheets

Exhibit B3-1: Habitat Features Details

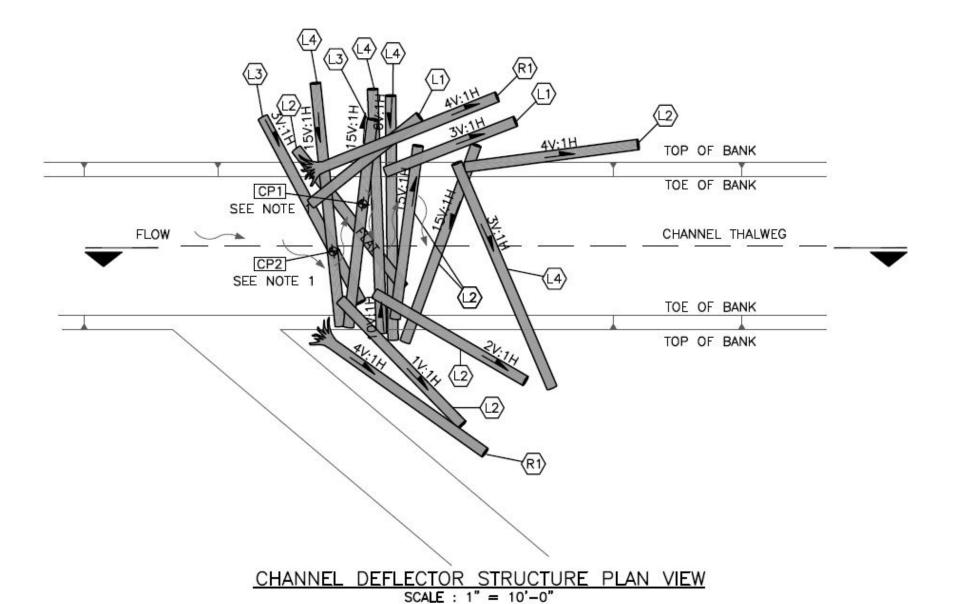
<u>Note:</u> The locations of all features shown are approximate. This Figure is for informational purposes only and is intended to assist in showing features discussed in the attached document. Neither the Port of Tacoma nor any of it's staff or consultants makes any warranty of any kind for this information, express or implied, including but not limited to to any warranties or merchantability or fitness for a particular purpose, nor shall the distribution of this information constitute any warranty.







INSTREAM MEANDER ROUGHENING STRUCTURE PLAN VIEW SCALE : N. T. S.

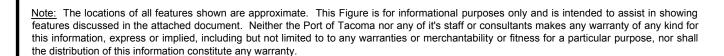


Reference: Information obtained from Bruce Dees and Associates and Herrera Design Plans.

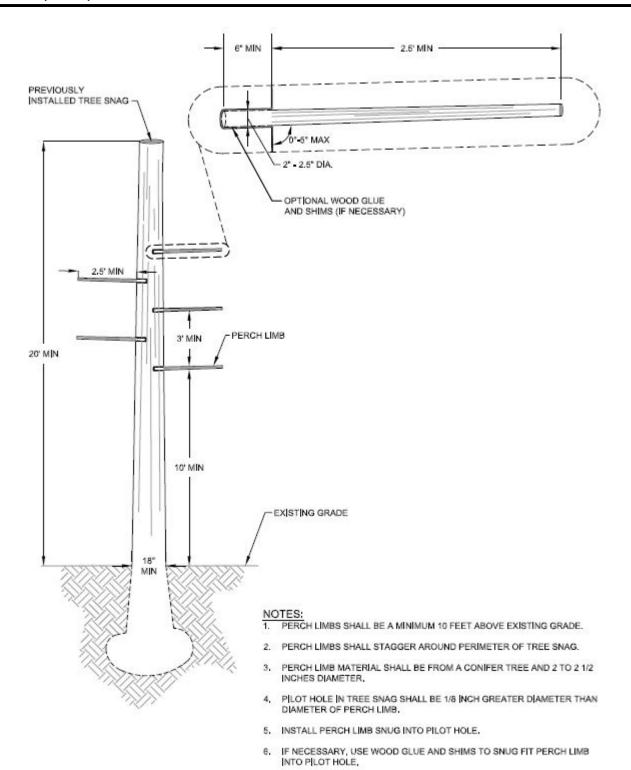


02/15/2017

Exhibit B3-2: Habitat Features Details



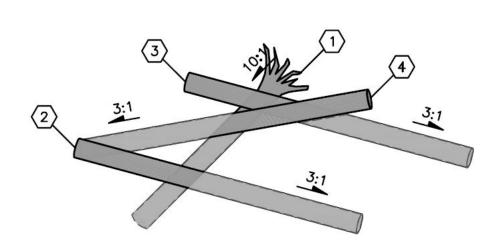




TREE SNAG PERCH LIMB INSTALLATION DETAIL

7. EACH TREE SNAG SHALL HAVE A MINIMUM OF 5 PERCH LIMBS.

N,T,S



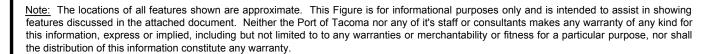
WETLAND LOG ROUGHENING STRUCTURE SECTION SCALE: N. T. S.

Reference: Information obtained from Bruce Dees and Associates and Herrera Design Plans.

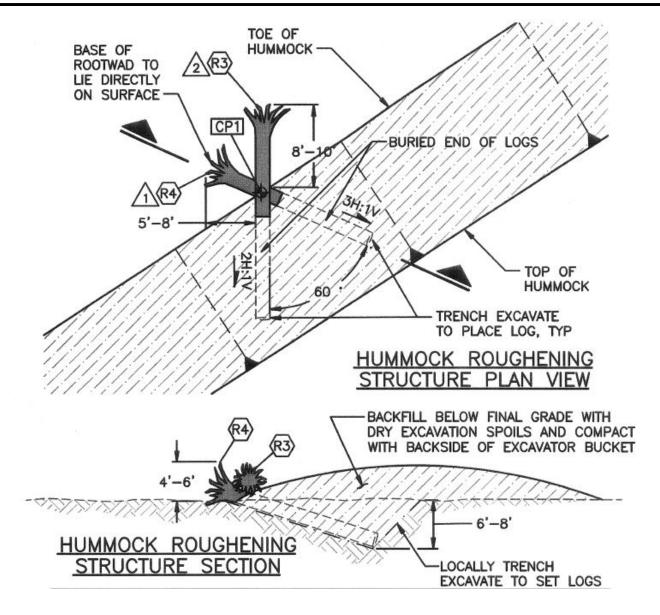
Tacoma

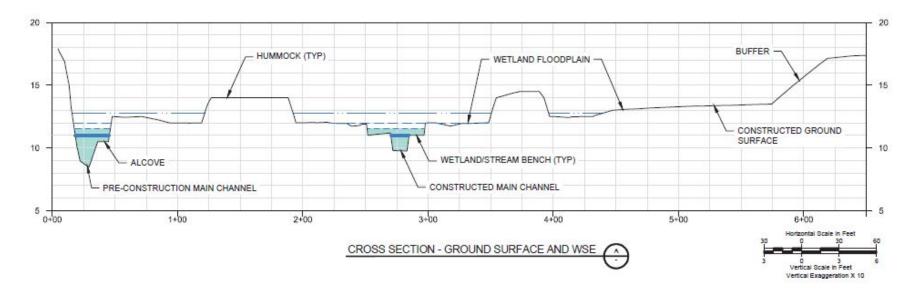
02/15/2017

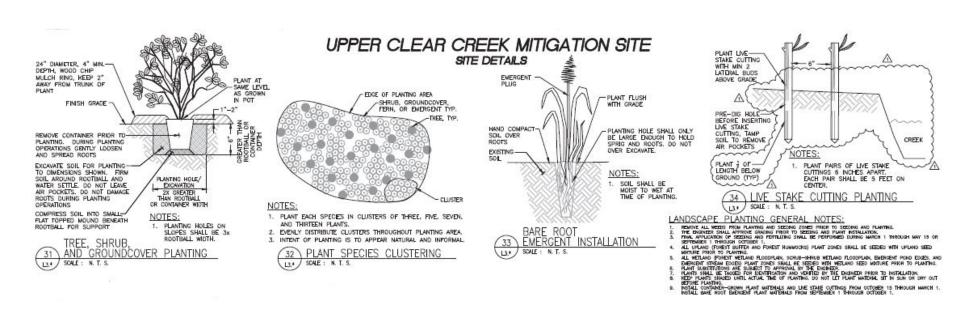
Exhibit B3-3: Habitat Features Details











Reference: Information obtained from Bruce Dees and Associates and Herrera Design Plans.



02/15/2017

APPENDIX C Bank Objectives and Performance Standards

Appendix C. Bank Objectives and Performance Standards

C1.0 REQUIREMENTS FOR BANK OBJECTIVES AND PERFORMANCE STANDARDS

- A. Implementation of the Bank is anticipated to result in substantial gains in aquatic ecosystem functions, as compared to those reflecting the baseline pre-compensatory mitigation site conditions, or those that would likely accrue on the site if the Bank was not constructed. The Sponsor must be able to demonstrate tangible aquatic ecosystem gains before Bank credits can be awarded for sale, use, or other transfer, because these functional gains will be used to offset comparable losses to other components of the aquatic environment in the Bank service area. The Bank's success will be measured by the enumerated objectives, each of which is subdivided into specific performance standards. The prescribed performance standards each provides a gauge for measuring the success of the ecological restoration and enhancement efforts at the Bank.
- B. Unless otherwise noted, all documentation required for demonstrating attainment of performance standards will be submitted to the IRT for review and approval as a condition of credit award. Documentation can typically be included in required monitoring reports. IRT award of credits will be reflected in a letter issued using a joint letterhead and signed by the Corps and Ecology.
- C. Recreational, educational, and scientific activities that do not conflict with the use limitations or other provisions of the conservation easement, do not interfere with the delineated purposes and goals of the Bank, and do not adversely affect the ecological viability and functionality of the Bank may take place on the Bank site. Specifically, the site may be used by the owners and guests for walking, bird watching and other passive recreation.
- D. All performance standards apply to the entire Bank site including the Bank buffers.

C2.0 BANK OBJECTIVES AND PERFORMANCE STANDARDS

Objective 1. Protect Aquatic Ecosystem Functions

Permanently protect aquatic ecosystem functions at the Bank by instituting the Instrument and implementing a conservation easement. Each of the performance standards associated with this objective must be met before any Bank credits may be awarded, and before any construction or other implementation activities (other than monitoring and maintenance of existing conditions and improvements) may be initiated pursuant to this Instrument. Any construction or implementation activities conducted on-site prior to the inception of the establishment period (other than monitoring and maintenance of existing conditions and improvements) must cease as of the effective date of this Instrument pursuant to Article VI.B.1, until the Objective 1 performance standards 1A, 1B, and 1C have been accomplished. The initial award of credits in recognition of accomplishment of these performance standards will serve as the IRT's notification that construction and implementation activities are authorized to commence.

TABLE C1. OBJECTIVE 1—PROTECT AQUATIC ECOSYSTEM FUNCTIONS—PERFORMANCE STANDARDS AND DOCUMENTATION

Performance Standard	Documentation
1A. Complete the development of an appropriate Mitigation Banking Instrument and Appendices.	Mitigation Banking Instrument has been signed by the Sponsor and the applicable regulatory agencies. An original signed Instrument must be provided to each of the signatories.
1B. Protect ecosystem function by placing IRT-approved conservation easement on the property.	Provide the IRT copies of the signed, IRT-approved conservation easement and evidence that it has been recorded with Pierce County and placed on the property title.
1C. Obtain all appropriate environmental documentation, permits, and other authorizations needed to establish and maintain the Bank.	Provide IRT with copies of all environmental documentation, permits, and other authorizations.

Objective 2. Hydrology

Re-establish wetland hydrology and create fish accessible aquatic habitat. Rehabilitate hydrologic connection between the channel system and floodplain wetlands, and create topographic complexity to support varied hydrologic regimes.

TABLE C2. OBJECTIVE 2—HYDROLOGY—PERFORMANCE STANDARDS AND DOCUMENTATION

	Performance Standard	Documentation
2A.	Create 1,000 feet of floodplain channels, two (2) PAB ponds, nine (9) alcoves of varying dimensions along right bank of Clear Creek, and 10 (ten) floodplain channel benches according to the approved plans.	As-built drawings and photographs showing completed stream channels, PAB ponds, alcoves and channel benches following first high flows after construction, approved by the IRT. This grading as-built report can be submitted before site planting is complete.
28.	The two diversion structures will be present and functioning properly to divert flow from Clear Creek into the Bank to maintain year-round surface inundation of the created channels, PAB ponds and outlet channels. Alcoves will be inundated by surface water at least 50 percent (183 days) of the year, and the shallow channel benches will be inundated by surface water at least 25 percent (91 days) of the year. To maintain fish passage, a minimum six-inch depth and 18-inch width will be maintained year-round within at least one route through the Bank.	Wells or stream gauges will be installed and equipped with data loggers at representative locations to monitor surface water depths in created channels, PAB ponds, alcoves, and channel benches continuously throughout the monitoring period. Hydrologic monitoring results for Years 1, 2, 3, 4, 5, 7, and 10 will be documented in Monitoring Reports for Years 1, 3, 5, 7 and 10 and approved by the IRT. Walking visual survey results (in conjunction with fish surveys conducted under Performance Standards 4C and 4D) will be documented in Monitoring Reports for Years 1, 3, 5, 7, and 10 and approved by the IRT.

TABLE C2. OBJECTIVE 2—HYDROLOGY—PERFORMANCE STANDARDS AND DOCUMENTATION (CONTINUED)

Performance Standard	Documentation
2C. A minimum of 26 acres of the site, including floodplain channels, alcoves, shallow channel benches, and PAB ponds will have wetland hydrology present for at least 30 consecutive days during the growing season at Year 3.	Monitoring report approved by the IRT showing the data from wells and/or soil pits sufficient to document the extent of wetland hydrology on the site. To demonstrate wetland hydrology, soil will be inundated or saturated to the surface, or there will be free water in soil pits or shallow water wells at 12 inches or less below the soil surface for at least 30 consecutive days of the growing season under normal precipitation or wetter conditions, where the growing season is defined in the 1987 Corps of Engineers Delineation Manual and appropriate supplements. (Refer to ERDC/EL TR_WRAP-00-1 and ERDC/EL TR_WRAP-05-2 to determine whether normal precipitation conditions are present and for water table monitoring methods.)
2D. A minimum of 26 acres of wetland (PFO, Existing PFO, PSS, PAB Ponds and PEM, and floodplain channels [including hummocks]) will be present on the site at Years 5 and 10.	Wetland delineation report approved by the IRT. The wetlands on site will be delineated according to the 1987 Corps Delineation Manual and appropriate supplements in effect at the time of delineation.

Objective 3. Vegetation

Remove residential and agricultural activities, invasive species, and establish native wetland vegetation communities comparable to pre-agricultural conditions on the site and in accordance with the targeted hydrologic regimes across the site.

Note: "Cover" is used in this MBI to mean the actual proportion of ground surface within the sample plot that is covered by a vertical projection of foliage (by single species or defined group of species) as viewed from above (or below for taller shrubs and trees), or by bare substrate.

TABLE C3. OBJECTIVE 3—VEGETATION—PERFORMANCE STANDARDS AND DOCUMENTATION

PERFORMANCE STANDARDS FOR ALL AREA	AS OF THE SITE
Performance Standard	Documentation
3A. Planting of site completed according to the IRT approved plans.	As-built planting plan approved by IRT showing completed planting. Include a species list, plant quantities, plant sizes, plant spacing and density, seeding rate and final planted acreages of vegetative community types.
3B. Within each habitat type (PFO, Existing PFO with voluntary understory plantings, PSS, PEM, PAB Ponds, and UPL [including hummocks]; [excluding existing PFO areas without voluntary understory plantings]) Himalayan blackberry (<i>Rubus armeniacus</i>), scotch broom (<i>Cytisus scoparius</i>), tansy ragwort (<i>Jacobaea vulgaris</i>), Canada thistle (<i>Cirsium arvense</i>), and bull thistle (<i>Cirsium vulgare</i>) do not collectively exceed 10% cover at Years 1, 3, 5, 7, and 10. Cover is not averaged for the entire site – the 10% limit applies to each habitat type.	Monitoring reports approved by IRT documenting non-native invasive species presence and percent cover. Document the percent cover of invasive species in each habitat type and data plot at Years 1, 3, 5, 7, and 10.
In Existing PFO areas without voluntary understory plantings, cover of invasive species listed above will remain equal to or less than Year 1 invasive species cover. Additional species may be added pursuant to Article VI.B.2.	
3C. Within each habitat type (PFO, Existing PFO with voluntary understory plantings, PSS, PEM, PAB Ponds, and UPL [including hummocks]); [excluding existing PFO areas without voluntary understory plantings]) reed canarygrass (<i>Phalaris arundinacea</i>) will not collectively exceed 30% at Years 1, 3, 5, 7, and 10. Cover is not averaged for the entire site –the prescribed limit applies to each habitat type.	Monitoring reports documenting reed canarygrass presence and percent cover approved by IRT. Document the percent cover of reed canarygrass in each habitat type and data plot at Years 1, 3, 5, 7, and 10.
In Existing PFO areas without voluntary understory plantings, cover of reed canarygrass will remain equal to or less than Year 1.	
3D. Over the entire site, zero tolerance of Japanese knotweed (Polygonum cuspidatum), giant knotweed (Polygonum sachalinense), Himalayan knotweed (Polygonum polystachyum), Bohemian knotweed (Polygonum x bohemicum), and related hybrids; purple loosestrife (Lythrum salicaria); and English ivy (Hedera helix). Map any specimens and eradicate during growing season of same year. Additional species may be added pursuant to Article VI.B.2.	Monitoring reports approved by IRT documenting identification and eradication. Inventory annually and include in monitoring reports at Years 1, 3, 5, 7, and 10.

TABLE C3. OBJECTIVE 3—VEGETATION—PERFORMANCE STANDARDS AND DOCUMENTATION (CONTINUED)

PERFORMANCE STANDARDS FOR EMERGENT FLOODPLAIN WETLAN	D MOSAIC AREAS (PEM)
Performance Standard	Documentation
3E. In the PEM wetland habitat, native emergent plant species will collectively have a minimum of 20% cover at Year 1, 30% cover at Year 3, 50% cover at Year 5, and 70% cover at Years 7 and 10.	In Years 1, 3, 5, 7, and 10, monitoring reports approved by IRT documenting PEM native species percent cover. Provide photos from established photo points.
PERFORMANCE STANDARDS FOR SCRUB-SHRUB FLOODPLAIN WET	LAND MOSAIC AREAS (PSS)
Performance Standard	Documentation
3F. In the PSS habitat, native trees and shrubs will collectively have a minimum of 10% cover at Year 1, 25% cover at Year 3, 50% cover at Year 5, 70% cover at Year 7, and 80% cover at Year 10.	In Years 1, 3, 5, 7, and 10, monitoring reports approved by IRT documenting native tree and shrub percent cover. Provide photos from established photo points.
PERFORMANCE STANDARDS FOR FORESTED FLOODPLAIN WETLAND	O MOSAIC AREAS (PFO)
Performance Standard	Documentation
3G. In the PFO habitat native trees and shrubs will collectively have a minimum of 10% cover at Year 1, 25% cover at Year 3, 40% cover at Year 5, 60% cover at Year 7, and 70% cover at Year 10.	In Years 1, 3, 5, 7, and 10 monitoring reports approved by IRT documenting percent cover of native trees and shrubs.
3H. In the PFO habitat, native trees will have a density of at least 225 trees/acre at Year 3, 200 trees/acre at Year 5, and 180 trees/acre at Year 7 and Year 10.	In Years 3, 5, 7, and 10, monitoring reports approved by IRT documenting density for native trees within plots. Trees are defined as those species that have the potential to reach greater than 20 feet in height at maturity.
PERFORMANCE STANDARDS FOR EXISTING FORESTED FLOODPLAIN	WETLAND AREA (EXISTING PFO)
Performance Standard	Documentation
3I. In the Existing PFO habitat, native tree canopy cover will not decrease from Year 1 by more than 15%.	In Years 3, 5, 7, and 10, monitoring reports approved by IRT documenting native tree canopy cover in Existing PFO.
PERFORMANCE STANDARDS FOR PALUSTRINE AQUATIC BED (PAB)	POND AREAS
Performance Standard	Documentation
3J. In the PAB pond habitats, native aquatic bed species will have a minimum of 5% cover within the entire PAB pond at Years 5, 7, and 10.	In Years 5, 7, and 10 monitoring reports approved by IRT documenting native PAB percent cover.

TABLE C3. OBJECTIVE 3—VEGETATION—PERFORMANCE STANDARDS AND DOCUMENTATION (CONTINUED)

PERFORMANCE STANDARDS FOR FORESTED UPLAND AREAS						
Performance Standard	Documentation					
3K. In the Forested Upland habitats, native trees and shrubs will collectively have a minimum of 10% cover at Year 1, 20% cover at Year 3, 35% cover at Year 5, 50% cover at Year 7, and 70% cover at Year 10.	In Years 1, 3, 5, 7, and 10 monitoring reports approved by IRT documenting native tree and shrub percent cover.					
PERFORMANCE STANDARDS FOR FORESTED HUMMOCK AREAS						
Performance Standard	Documentation					
3L. In the Forested Hummock habitats, native trees and shrubs will collectively have a minimum of 10% cover at Year 1, 20% cover at Year 3, 35% cover at Year 5, 50% cover at Year 7,	In Years 1, 3, 5, 7, and 10 monitoring reports approved by IRT documenting					

Objective 4. Fish and Wildlife Habitat

Create and improve habitat for fish and wildlife on the site by installing habitat features and creating diverse stream, wetland and riparian habitat.

TABLE C4. OBJECTIVE 4—FISH AND WILDLIFE HABITAT—PERFORMANCE STANDARDS AND DOCUMENTATION

Performance Standard	Documentation
4A. Habitat features installed according to the approved plan. Habitat features include 32 forested upland hummocks, 33 channel roughening LWM structures in channels, alcoves, and PAB ponds, 72 hummock and floodplain roughening LWM structures, and 13 tree snag structures.	As-built drawings approved by the IRT showing locations and numbers of habitat features.
4B. A minimum of 80% of the original number, as shown on the approved as-built drawings, of each type of habitat feature will be present at Year 10. Habitat features include 32 forested upland hummocks, 33 channel roughening LWM structures in channels, alcoves, and PAB ponds, 72 hummock and floodplain roughening LWM structures, and 13 tree snag structures.	Document numbers and locations of habitat features in Year 10 monitoring report approved by the IRT. LWM recruited and secured (by established vegetation) will qualify towards the final 80% remaining calculation.

TABLE C4. OBJECTIVE 4—FISH AND WILDLIFE HABITAT—PERFORMANCE STANDARDS AND DOCUMENTATION (CONTINUED)

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4C. Perform a fish presence/absence survey in Years 1, 3, and 7 within the channels, alcoves, and PAB ponds of Clear Creek. Document the presence/absence of juvenile anadromous fish utilizing created aquatic areas (channels) within the bank project boundaries and around installed LWM.

Fish presence surveys will be conducted during Years 1, 3, and 7 to provide information on the fish species present and their corresponding life stage, as they utilize restored habitat areas on the Bank site.

4D. Survey and document the presence of adult salmon within the Bank site channels, alcoves, and PAB ponds of Clear Creek during Years 1, 3, 5, 7, and 10.

Documentation

Fish presence/absence surveys will be completed per applicable NMFS/WDFW methods for surveying of anadromous fish, as further detailed in Appendix F. Survey documentation will be submitted and approved by the IRT.

The timing of fish presence/absence surveys for juvenile salmonids will be based on the outmigration patterns of Chinook (and Coho) salmon in Clear Creek. Fry are generally first observed in the Puyallup River system in February. The number of fry outmigrants usually peak initially in March with a larger peak in late May or early June that generally follow high flow events. In accordance with these events, surveys will generally occur during or after peak flows in the late Winter and Spring (February – June).

Fish presence/absence surveys can be conducted through visual monitoring in the channels within the bank without the need for fish handling. After Year 1, in coordination with NMFS, USFWS, WDFW, and affected tribes if it is determined that electrofishing, fyke traps, or other sampling method is necessary to achieve greater quantitative understanding of fish use in the Bank site, an application for a research permit from NOAA will be submitted to provide for incidental take allowance, such that this technique can be applied in Years 3, and 7 of fish monitoring.

In Years 1, 3, 5, 7, and 10 monitoring reports approved by the IRT, visually document and/or photo document and report on adult salmon presence within the habitat areas of the bank project. Visual and/or photo documentation will occur in the fall/winter of each monitoring year. These surveys must be conducted without handling fish such that incidental take allowance is not required under the current project description from which consultation proceeded.

APPENDIX D Credit Generation and Award Schedule

Appendix D. Credit Generation and Award Schedule

D1.0 DEFINITION OF CREDIT VALUES

- A. Universal Credits and Fish Conservation (Discounted Service Acre Year [DSAY]) Credits will be established and awarded upon the Sponsor's demonstration that the performance standards reflected in Appendix C, Section C2.0 have been met.
- B. A "Universal Credit" is defined as a unit of measure representing the increase in the ecological value of the Bank. A Universal Credit for this Bank represents the increase in functions, values, and areal extent of the aquatic systems on the project site. This increase in function results from the re-establishment, rehabilitation, and enhancement of wetlands and their associated uplands on the Bank site as detailed in Appendix B and Table D1 below. The anticipated number of Universal Credits reflected in Table D1 are determined based on the projection, if the performance standards are achieved, that the re-established, rehabilitated, and enhanced wetlands and associated upland areas at the Bank site will rate as highly functioning wetland, riparian, and upland systems upon maturity. The Bank site includes wetlands that are classified as "depressional and riverine" under the Hydrogeomorphic (HGM) classification and "palustrine and riverine" under the Cowardin classification system. A Universal Credit is also based on the improvement to water quality, water quantity and habitat functions within the re-established and rehabilitated wetlands on the Bank site which are documented as performance standards are met.
- C. A discounted-service-acre-year ("DSAY," also known as a "Fish Conservation Credit" both of which are used in the Instrument) is a unit of measure derived from functional gains in fish habitat as measured using Habitat Equivalency Analysis or "HEA." HEA has been used over the last two decades in National Oceanic and Atmospheric Administration's (NOAA's) Damage Assessment and Restoration Program to help value damages to certain near-shore habitats, in order to negotiate Natural Resource Damages Settlements with Responsible Parties in Superfund sites (EPA, 1980). Most recently, HEA has been utilized to evaluate the benefits provided to listed species such as Chinook salmon in conservation bank projects. HEA, based on a Stated Preference economics model, has the flexibility to provide across-habitat evaluations of both habitat loss (injury) and habitat gain (compensation for loss) (i.e., Habitat Equivalency Analysis) (Wolotira, NOAA 2008). HEA can be employed to evaluate ecological function gains from restoring habitats within areas such as riverine floodplains and estuarine habitats that have value to anadromous fish species. Ecological function gains on the Bank project is determined by comparing habitat types and conditions in areas within the Clear Creek floodplain before and after restoration occurs.

Four components are used within HEA to generate DSAY values at the Bank: 1) a valuation of all habitat types relevant to anadromous fish within the floodplain portion of the project area before and after restoration occurs; 2) estimates of the time needed for each restored habitat to achieve its full ecological function value for anadromous fish; 3) the duration that the restored habitat will continue to fully function; and a 4) discounting factor.

The Bank project has delineated eight distinct habitat types within the floodplain that are beneficial to anadromous fish, based upon the definitions in the Lower Willamette River HEA Model (US Fish and Wildlife Service [FWS], 2012) and as modified by NOAA for this Bank. Each distinct habitat type is given

an incremental value between 0 and 1 (0 denoting "not functioning" and 1 denoting "fully functioning") and an expected time for that habitat type to reach full function and maturity. The total habitat gain/loss equation is shown below and total DSAYs derived from each habitat type found within the Bank are documented in Table D2 in Section D2 of this appendix.

$$Total\ Habitat\ Gain/Loss = \sum_{t=t_0}^{t_t} V_t A (1+d)^{(T-t)}$$

Where:

Vt = value of habitat gain at time t per unit area of injured habitat

A = area of restored habitat

tt = year in which services are completely recouped/duration of existence of restoration site

tO = time when impact occurs, usually zero

T = base year/present time, usually zero

d = discount rate, NMFS uses three percent

- D. The Bank will generate both Universal Credits and DSAY Credits. Universal Credits and Fish Conservation (DSAY) Credits will be totaled up for the Bank and the conversion factor of Universal Credit to DSAY Credit will be determined to avoid double-counting of credits for compensatory purposes. When either type of credit is debited, the equivalent and corresponding credit amount of either the Universal Credit or DSAY Credit will also be taken off the ledger. If an applicant desires or is required to apply both Universal Credits and DSAY Credits for a specific impact mitigation, whichever amount of Universal Credit or DSAY Credit is the greatest during the evaluation and permitting process, will be used as the correct amount of credit to debit from the Bank. NMFS must concur in all credit generation and award transactions involving DSAYs, in conjunction with consultation with the other members of the IRT.
- E. The precise number of both Universal Credits and DSAY Credits actually generated by the Bank cannot be determined until the success of the reestablishment, rehabilitation and enhancement activities is assessed by the IRT. The final number of Universal Credits and DSAY Credits will be determined by the Corps and Ecology, with the concurrence of NMFS when Fish Conservation Credits are involved, and in consultation with the other members of the IRT, and will be based on achievement of the performance standards set forth in Appendix C of this Instrument. DSAY Credits have a discounted present value based upon the time needed for the restoration activities to reach full function. In Years 5 and 10 the Sponsor may request to reevaluate the existing habitat types to determine whether the unused DSAY Credit values have reached full maturity and function more quickly than originally anticipated.

D2.0 CREDIT GENERATION

A. A Table showing Universal Credits generation ratios and total credit amounts for each habitat type will be calculated as shown below in Table D1 and depicted in Figure B1. The total amount of Universal Credits that can be generated at the Bank is 12.56. No Universal Credits are generated by the Bank buffers.

TABLE D1. UNIVERSAL CREDIT GENERATION BY BANK DEVELOPMENT ACTIVITY

Bank Activity	Area (Acres) of Credit Generation	Credit Ratio (Activity Area: Number of Credit)	Anticipated Number of Credits
Wetland Re- establishment	3.13	1:1	3.13
Wetland Rehabilitation	18.32	2:1	9.16
Wetland Rehabilitation (PAB only)	0.76	3:1	0.24
Forested Upland Enhancement	0.13	5:1	0.03
Total	22.34	-	12.56

- B. A Table showing the number of DSAY Credits generated at the Bank using the Bank HEA Model (modified from the Lower Willamette River HEA Model) will be calculated as shown below in Table D2 and depicted in Figure B3. The definitions of these habitat types under the Lower Willamette River HEA Model and the rationale for crediting each area at the Bank are contained in the Project Resource Folder.
- C. During initial informal coordination with NMFS, the amount of DSAY Credits generated by the Bank has been discounted by 50 percent (273.15 DSAYs) due to existing conditions that affect upstream fish passage of juvenile fall Chinook from the Puyallup River (see Table D2). During development of this MBI, NMFS and the IRT reviewed and confirmed this credit discounting for the following reasons. The Bank is located above a tide gate (albeit a highly improved one) and at least one lengthy culvert. However, NMFS and the IRT have agreed that if conditions change in relation to upstream fish passage between the Bank and the Puyallup River, reduced DSAYs generated by the site will be restored and released to the Sponsor as described below in Section D2.0.D.
- D. The Sponsor, in coordination with NMFS and the IRT, developed the following process for restoring the discounted credits associated with correcting the three identified fish passage barriers. Any modification to the number of credits to be generated and awarded in Tables D2 and D3 will be effected through the process for the amendment of the Appendices reflected in Article VI.B.2. of the Basic Agreement. Improvement of any of the three partial fish passage will restore discounted DSAYs independently of the other two. The tide gate is the most highly ranked partial fish passage barrier because during high flows on the Puyallup River, the gate closes and does not provide upstream access for juvenile salmonids. If the tide gate at the Puyallup River is completely removed, 25% (136.58 DSAYs) of the Total DSAY Credits will be restored due to the additional fish access allowed during periods of high flow on the Puyallup River. The amount of credits to be restored for any improvement to the Puyallup River tide gate other than full removal will be proposed by the Sponsor and reviewed and approved by the IRT. If the River Road (SR 167) culvert is removed or replaced with an alternative structure that improves upstream fish passage by juvenile salmonids, 15% (81.94 DSAYs) of the Total DSAY Credits will be restored because the existing culvert is a cast in place concrete culvert

approximately 150 feet in length. Also, if the Gay Road culvert is removed or replaced with an alternative structure that improves upstream fish passage by juvenile salmonids, 10% (54.63 DSAYs) of the Total DSAY Credits will be restored because the existing culvert is already a pre-cast concrete box culvert approximately 100 feet in length.

TABLE D2. DSAY CREDIT GENERATION BY BANK DEVELOPMENT ACTIVITY AND HABITAT CONVERSION TYPES

Existing Habitat and Type	Habitat Value (Before)	Acres	Proposed Habitat and Type ^a	Habitat Value (After)	Years Until Full Function	DSAYs ^b Value/ Acre	DSAYs ^c for Habitat
Upland: invasive vegetation	0.1	1.61	Upland: native forest in floodplain (enhancement)	0.65	40 (80% in 10 years)	15.458	24.89
Upland: invasive vegetation	0.1	0.06	Off Channel: tributary – cold (main channel)	1	1	29.996	1.80
Riparian Wetland: invasive vegetation	0.3	0.11	Off Channel: tributary – cold (main channel)	1	1	23.330	2.57
Upland: invasive vegetation	0.1	0.07	Alcoves on side channel (along baseline Clear Creek)	0.8	1	23.330	1.63
Upland: invasive vegetation	0.1	4.07	Active Channel Margin: unarmored native vegetation, low angle (wetland re-establishment)	1	3	29.130	118.56
Riparian Wetland: invasive vegetation	0.3	12.47	Active Channel Margin: unarmored native vegetation, low angle (wetland rehabilitation)	1	3	22.657	282.53
Riparian Wetland: invasive vegetation	0.3	1.1	PAB Ponds and PAB Pond Outlet Channels	0.8	1	16.664	18.33
Riparian Wetland: native forest, in historic floodplain	0.65	0.06	Off Channel: tributary – cold (main channel)	1	1	11.665	0.70

TABLE D2. DSAY CREDIT GENERATION BY BANK DEVELOPMENT ACTIVITY AND HABITAT CONVERSION TYPES (CONTINUED)

Existing Habitat and Type	Habitat Value (Before)	Acres	Proposed Habitat and Type ^a	Habitat Value (After)	Years Until Full Function	DSAYs ^b Value/ Acre	DSAYs ^c for Habitat
Riparian Wetland: native forest, in historic floodplain	0.65	8.17	Active Channel Margin: unarmored native vegetation, low angle (wetland rehabilitation)	1	1	11.665	95.30
				Total D	SAYs Genera	ated by the Bank:	546.31
NMFS/IRT 50% Reduction:b						- 273.15	
Total DSAYs Initially Available:b						273.16	

Notes:

(a) The listed "Proposed Habitat and Type" in each row is reflective of the HEA terminology and a cross-reference to the associated MBI terminology is provided in parentheses. (b) DSAY = Discounted Service Acre Year; (c) NMFS and the IRT have reduced the number of DSAYs generated at the Bank by 50 percent to reflect the Bank location above a tide gate (albeit a highly improved one), the River Road culverts, and the Gay Road culverts. However, NMFS and the IRT have agreed that if conditions change in relation to upstream fish passage between the Bank and the Puyallup River, the reduced DSAYs will be reinstated as described in Section D.2.0.D of this Instrument.

E. Table D3 below shows the total amount of Universal Credit and the initial total amount of DSAY Credits generated at the Bank. For the purposes of debiting the correct amount of equivalent and corresponding bank credits from the bank ledger, an initial ratio of one (1) Universal Credit to 21.74 DSAY Credits will be used.

TABLE D3. UNIVERSAL CREDITS TO DSAY CREDITS CONVERSION FACTOR

Total Universal Credits ¹	Initial (Discounted) DSAYs Available ¹	Initial (Discounted) Credit Ratio (Universal Credit: DSAYs)
12.56	273.16	1:21.74
Total Universal Credits ¹	Total DSAYs	Total Credit Ratio (Universal Credit: DSAYs)
12.56	546.31	1:43.46

Notes

1) 273.16 DSAYs represent 50% reduction in DSAYs from the original total DSAYs generated by the Bank of 546.31; the reduced DSAYs may be restored as described above in Section D.2.0.D

D3.0 CREDIT AWARD SCHEDULE

A. Credits will be awarded to the Bank for sale, use, or other transfer as the performance standards associated with those credits are met, with the following exceptions: (1) no credits may be awarded

prior to meeting all of the performance standards associated with Objective 1 in Appendix C, and (2) no credits associated with the Year 10 performance standards may be awarded until at least 60 percent of all possible credits associated with Years 0 through 9 have been awarded. DSAY credits will be awarded in proportion to the Universal Credits released as performance standards are achieved. If performance standards are not achieved and Universal Credits are not released, the corresponding amount of DSAY Credits will not be released, based upon the Universal Credit to DSAY Credit conversion factor in Table D3. DSAY Credits and Universal Credits will be debited from the bank ledger based upon the credit conversion factor contained in Table D3 which shows the maximum amount of DSAY Credits and Universal Credits available. If the expected HEA habitat values in the Bank cease to be an accurate representation of current or expected conditions (positively or negatively), HEA habitat values can be recalculated and the Universal Credit to DSAY Credit conversion factor may be adjusted to account for those changes, with approval of the Corps and Ecology, with the concurrence of NMFS when Fish Conservation Credits are involved, and in consultation with the other members of the IRT. This action could occur if there are adaptive management actions or unexpected changes to site conditions that affect the current and expected HEA Habitat Value at the Bank.

- B. The Corps and Ecology, with the concurrence of NMFS when Fish Conservation Credits are involved, and in consultation with the IRT, will typically approve the award of credits according to the schedule in Table D4, below. Credits may not be awarded sooner than specified in Table D4, except where otherwise noted or in extraordinary situations with the written approval of the Corps and Ecology, in consultation with the other members of the IRT. If the Bank is not able to meet a particular performance standard by the year indicated in Table D4, the Sponsor may submit documentation of successful satisfaction of that performance standard during a subsequent year, and the Corps and Ecology, in consultation with the IRT, will give full consideration to the award of appropriate credits for sale, use, or transfer without reduction or other penalty.
- C. The Corps and Ecology (with NMFS's concurrence when Fish Conservation Credits are involved) may, at their discretion following consultation with the IRT, award partial credit for partial accomplishment of a performance standard. In the event a specific performance standard is not met, but the IRT feels that the site is progressing satisfactorily, the Corps and Ecology may at their discretion, following consultation with the IRT, award credits.
- D. Once a credit is awarded, the Bank may sell, use, or otherwise transfer that credit at any time, subject to the provisions of this Instrument.
- E. If the institution of an adaptive management or remedial action plan as described in Section F4.0 of Appendix F causes delay in the achievement of a performance standard, the timeline for achievement of each subsequent milestone for that performance standard will be deferred for a like interval, unless otherwise specifically approved by the Corps and Ecology (with NMFS's concurrence when Fish Conservation Credits are involved), following consultation with the IRT. The Corps and Ecology (with NMFS's concurrence when Fish Conservation Credits are involved), following consultation with the IRT and with the Sponsor, will determine what remedial actions are necessary to correct the situation, pursuant to Article IV.H. and Section F4.0, and direct their performance prior to the award of any additional mitigation credits.

TABLE D4. CREDIT RELEASE SCHEDULE

Potential Universal Credits to be Released: 12.56	Pre- Construction Credits	Year 0 ¹ Credits	Year 1 Credits	Year 3 Credits	Year 5 Credits	Year 7 Credits	Year 10 Credits	Total Credits
Objective 1. Administrative Protections								
1A. MBI signed	0.59							0.59
1B. Conservation Easement recorded	0.59							0.59
1C. Obtain all authorizations and permits	0.58							0.58
Objective 2. Hydrology								
2A. Grading as-built		0.67						0.67
2B. Establish stream hydrology			0.12	0.10	0.20	0.17	0.08	0.65
2C. Wetland hydrology				0.10				0.20
2D. Minimum wetland acreage					0.20		0.20	0.40
Objective 3. Vegetation – All Areas of Site								
3A. Planting as-built		0.67						0.67
3B. Maximum cover invasive species			0.10	0.10	0.20	0.16	0.07	0.62
3C. Maximum cover reed canarygrass			0.10	0.10	0.20	0.16	0.07	0.62
3D. Zero tolerance invasive species (not including reed canarygrass)			0.10	0.10	0.20	0.16	0.07	0.61

TABLE D4. CREDIT RELEASE SCHEDULE (CONTINUED)

Potential Universal Credits to be Released: 12.56	Pre- Construction Credits	Year 0 ¹ Credits	Year 1 Credits	Year 3 Credits	Year 5 Credits	Year 7 Credits	Year 10 Credits	Total Credits
Palustrine Emergent Floodplain Wetland Areas (PEM)								
3E. PEM species percent cover			0.10	0.10	0.20	0.16	0.08	0.62
Palustrine Scrub-Shrub Floodplain Wetland Areas (PSS)								
3F. PSS species percent cover			0.10	0.10	0.20	0.16	0.08	0.62
Forested Floodplain Wetland Mosaic Areas (PFO)								
3G. PFO species percent cover			0.10	0.10	0.20	0.16	0.08	0.62
3H. Tree density				0.10	0.19	0.16	0.07	0.52

TABLE D4. CREDIT RELEASE SCHEDULE (CONTINUED)

Potential Universal Credits to be Released: 12.56	Pre- Construction Credits	Year 0 ¹ Credits	Year 1 Credits	Year 3 Credits	Year 5 Credits	Year 7 Credits	Year 10 Credits	Total Credits
Existing Forested Floodplain Wetland Areas (Existing PFO)								
3I. PFO species percent cover				0.10	0.20	0.16	0.07	0.61
Palustrine Aquatic Bed (PAB) Pond Areas								
3J. Native vegetation percent cover					0.19	0.16	0.07	0.42
Forested Upland Areas (UPL)								
3K. UPL species percent cover			0.10	0.10	0.20	0.16	0.07	0.61
Forested Hummock Areas								
3L. Woody species percent cover			0.10	0.10	0.19	0.16	0.07	0.60
Objective 4. Fish and Wildlife Habitat								
4A. Habitat features as-built		0.67						0.67
4B. Habitat features remain per MBI							0.08	0.08
4C. Fish presence/absence surveys			0.10	0.10		0.17		0.36
4D. Adult salmon survey			0.10	0.10	0.20	0.16	0.08	0.63
Universal Credit Subtotals	1.76	2.01	1.12	1.40	2.77	2.26	1.24	12.56
Total Universal Credits	1.76	3.77	4.89	6.29	9.06	11.32	12.56	12.56
DSAY Credit Subtotals	38.28	43.71	24.36	30.45	60.24	49.15	26.97	273.16
Total DSAY Credits	38.28	81.99	106.35	136.80	197.04	246.19	273.16	273.16 2

Notes:

^{1) *} Year 0 is the year during which construction is completed and the as-built report is submitted by the Sponsor and approved by the IRT. Year 1 is the first year of site monitoring following construction. Credits will not be awarded until the approval of as-built drawings and monitoring reports by the IRT. 2) 273.16 DSAYs represent 50% reduction in DSAYs from the original total DSAYs generated by the Bank of 546.31; the reduced DSAYs may be restored as described above in Section D2.0.D.

D4.0 REFERENCES

- EPA (U.S. Environmental Protection Agency). 1980. Compensation, beyond remediation, for damages covered by the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). (42 U.S.C. § 9601 et seq.)
- FWS (U.S. Fish and wildlife Service). 2012. Relative Chinook Salmon Lower Willamette Habitat Values. US Fish and Wildlife Service, Oregon Fish and Wildlife Office. August 2012. Accessed on June 21, 2013. http://www.fws.gov/oregonfwo/contaminants/portlandharbor/Documents/Q4Habitat ValuesTable_1729.pdf.
- Herrera Environmental Consultants, Inc. 2013. Habitat Evaluation of Site Conditions for ESA-Listed Species

 Upper Clear Creek Mitigation Site.
- Wolotria, R. J., 2008. Habitat Evaluation of the Blue Heron site for a specific type of juvenile Chinook salmon. National Marine Fisheries Service Northwest Region.

APPENDIX E

Procedures for Use of Bank Credits and Debit Use

Appendix E. Procedures for Use of Bank Credits and Debit Use

E1.0 BANK SERVICE AREAS

Credits from the Bank will be used within two distinct service areas depending on the type of credit required; one service area will define the use of the Bank when an applicant uses Universal Credits for wetlands, buffers or other aquatic resource impacts and another service area will define the use of the Bank when the applicant uses Fish Conservation (Discounted Service Acre Year [DSAY]) credits for Endangered Species Act (ESA) listed fish and their designated critical habitat and non-listed fish habitat impacts. The Bank may be used to compensate for permitted (permanent, direct, indirect, temporary and buffer) impacts that are located within the service area if specifically approved by the appropriate agencies requiring mitigation.

- 1. The service area for Universal Credits which includes impacts to wetlands, critical area buffers and other regulated aquatic resources is based upon the aquatic functions rehabilitated, re-established, and enhanced at the Bank, in conjunction with similar potential aquatic resource impacts in the Puyallup River Watershed (Figure E1).
- The service area for ESA-designated and proposed species and critical habitat, non-listed and resident
 fish, and stream and marine habitat impacts (as measured through DSAYs) is based upon the Bank
 project's restored habitat areas and the potential use of that habitat by ESA-designated species and
 non-listed fish species in the same ecologically significant unit (ESU), or related river system or marine
 nearshore habitat (Figure E2).

E2.0 SERVICE AREA BOUNDARY FOR UNIVERSAL CREDIT USE

The service area boundary for Universal Credits for direct, indirect, and/or temporary aquatic resource impacts includes a portion of Water Resource Inventory Area (WRIA) 10 (Puyallup – White) from the Ordinary High Water Mark (OHWM) of Commencement Bay and Puget Sound up to an elevation of 2,100 feet above sea level in Pierce and King Counties (Figure E1). The northern boundary of the service area is the WRIA boundary between WRIA 10 and WRIA 9 from the OHWM of Puget Sound (47.3359 N -122.365 W) eastward to an elevation of 2,100 feet near Boise Ridge (47.2061 N -121.9042 W). From this point the service area boundary follows the 2,100-foot elevation contour until it reaches the boundary between WRIA 10 and WRIA 11 (46.9221 N -122.1295 W). The service area then follows the WRIA 10 boundary west and north to the OHWM of Commencement Bay (47.2683 N -122.4476 W). The service area then follows the OHWM of Commencement Bay and Puget Sound to the point of origin mentioned previously (47.3359 N -122.365 W). Marine waters of Commencement Bay and the Puget Sound are excluded from the service area because the Bank does not include marine aquatic resource improvements. The White River below OHWM and Muckleshoot Indian Tribe-owned lands are excluded from the service area unless specifically approved by the Muckleshoot Indian Tribe.

The service area was developed using an ecologically appropriate evaluation of existing and historic habitat distributions and floodplain processes in accordance with the *Washington State Wetland Mitigation Bank Service Area Guidance* (Ecology, undated) document. The extent of the service area was initially developed using the boundaries of WRIA 10; however, through negotiations with the IRT the service area was revised to exclude a portion of WRIA 10. The Muckleshoot Indian Tribe requested that impacts in the White River

and impacts on Muckleshoot Indian Tribe-owned lands not be exported to a mitigation site at a different location; therefore, these areas are excluded unless specifically approved by the Muckleshoot Indian Tribe. In addition, marine aquatic resources in the western portion of the service area and aquatic habitat above elevation 2,100 feet in the eastern portion of the service area were excluded from the service area because they are not consistent with the aquatic resource functions, processes, and characteristics of the Bank as described below.

The service area is ecologically appropriate because it shares similar hydrography, habitat types, floodplain processes and historic alterations as the Bank. The service area historically contained complex networks of sloughs, ponds, wetlands and tributary streams surrounded by extensive riparian forests (Puyallup River Watershed Council, 2014; Pierce County, 1997). Removal of large woody material (LWM), stream channelization, and disconnection of the floodplain have led to the loss of habitat diversity normally provided by off channel habitat, pools and backwaters (Pierce County, 2012).

The service area includes a mix of coniferous and deciduous forests. The Conservation Biology Institute maps "Forest Mixed Warm (EN)" habitat classification through most of the service area and "Forested Evergreen Needle Maritime" in the eastern portions of the service area (Kuchler 1964). The Northwest Habitat Institute identifies two primary historic habitat types within the service area: Westside Lowlands Conifer-Hardwood Forest (Chappell et al. 2011) and Herbaceous Wetlands (Crawford et al. 2011). Although the Bank is mapped to occur within the eastern edge of the area mapped as Westside Grasslands, it is important to note that this map was created at a 1:24,000 scale and does not always reflect the exact transition between two habitat types. The baseline and current conditions at the Bank include emergent (herbaceous) and forested wetlands; which are consistent with the two dominant historic habitat types mapped throughout the service area.

The historic and existing floodplain processes at the Bank are consistent with those found through the service area in the lower elevation portions of WRIA 10. These functions, processes, and characteristics include:

- Low elevation, broad floodplains which historically provided floodplain functions including flood flow moderation, sediment deposition, and groundwater recharge;
- The presence of oxbow ponds, back channels, side channels, and floodplain wetlands;
- Aquatic resource and riparian habitat along tributaries to the Puyallup River used by fish and wildlife;
- Riparian vegetation communities which provide LWM recruitment, forage and refuge opportunities for fish and wildlife, and shading of streams and rivers; and
- Historic floodplain alterations including channel straightening, levee construction, and installation of drainage features to control flood flow and support agriculture and other floodplain development.

The Bank has re-established and rehabilitated riverine floodplain hydrogeomorphology to improve aquatic resources and fish habitat in the Lower Puyallup River that has largely been lost to human encroachment over more than the last century. The service area has been established to encompass the portion of the Puyallup River watershed that shares similar existing and/or historic aquatic habitat processes with the Bank. The upper limits of the service area were established based on a reasonable geographic distance of potential projects from the Bank location, as well as similar topographic features, hydrology and habitat connectivity.

E3.0 SERVICE AREA BOUNDARY FOR FISH CONSERVATION (DSAY) CREDIT USE

The service area for offsetting permanent, indirect, and/or temporary habitat impacts to ESA-designated and proposed species and critical habitat for listed species, as well as non-listed and resident fish species and stream and marine habitat impacts, includes portions of the Puyallup River Watershed (WRIA 10) and portions of Commencement Bay marine environment in WRIAs 10 and 12. The White River Basin and Muckleshoot Indian Tribe-owned lands are excluded from the service area unless specifically approved by the Muckleshoot Indian Tribe. The limits of the service area for ESA designated fish and non-listed fish habitat are described below and shown on Figure E2.

The service area for the use of DSAY credits generated at the Bank was developed based on the known and expected utilization of freshwater and marine fish habitat by juvenile and adult Puyallup River stock Chinook salmon (*Oncorhynchus tshawytscha*), steelhead trout (*O. mykiss*), and other ESA-listed species. This is consistent with the approach for Commencement Bay suggested in Simenstad (2000), which states:

Unlike many mitigation and restoration actions that have addressed impacts to aquatic habitats in Commencement Bay in the past, responding to the broader ESA mandate demands a more comprehensive, ecosystem-based approach to juvenile salmon requirements in a highly impacted estuarine and lower perennial riverine landscape.

Appropriate agency staff from Washington Department of Fish and Wildlife, Washington Department of Ecology, U.S. Fish and Wildlife Service, National Marine Fisheries Service, and U.S. Army Corps of Engineers and tribal staff for the Puyallup and Muckleshoot Indian Tribes, with expertise in fish conservation within the watershed, were consulted and coordinated with to determine the WRIA and watershed boundaries used to delineate the boundaries of this service area. The service area includes freshwater fish habitats of the lower Puyallup River watershed within WRIA 10 and marine fish habitat in WRIA 10 and a small portion of WRIA 12 (Figure E2).

The service area includes the Puyallup River and its tributaries up to the confluence with the Carbon River at approximately river mile (RM) 17.9. Specifically, the eastern limits of the service area include subwatersheds of Fennel Creek – Puyallup River (HUC12 – 171100140501), and Puyallup River (HUC12 – 171100140502) due to similarities in fish stock utilization and fish habitat conditions among the Bank site and these subwatersheds. The service area does not extend into subwatersheds of the White River (HUC12 – 171100140404), Boise Creek – White River (HUC12 – 171100140403), South Prairie Creek (HUC12 – 171100140104), Lower Carbon River (HUC12 – 171100140106), or Fiske Creek – Puyallup River (HUC12 – 171100140205) due to the presence of spring Chinook in the White River and its tributaries, and because fish habitat transitions from lower floodplain streams and rivers used for rearing, foraging, overwintering, and migration into key spawning habitat of WRIA 10.

The DSAY credits from the Bank will not be used to compensate for impacts to White River spring Chinook habitat on the White River. The White River is not included within the service area because impacts to the White River that affect spring Chinook should not be "exported" outside of the primary habitat used by this local salmonid population. However, impacts within the White River basin can be reviewed for use of Bank DSAYs on a case-by-case basis through out-of-service area requests to identify whether a potential impact affects White River spring Chinook or if the Bank would adequately replace the fish habitat functions and ecological processes lost by the potential impact.

Marine nearshore rearing, habitat for juvenile Chinook is highly limited in Commencement Bay, as is freshwater off-channel rearing, forage, and refuge habitat in the lower Puyallup River (Simenstad, 2000). Dredge and fill activities along the shorelines of Commencement Bay have dramatically reduced rearing, forage, and refuge opportunities for juvenile salmonids, and channelization of the lower Puyallup River and installation of levees has disconnected the river from its historic floodplain. The Bank has increased the amount of these types of limited fish habitat by creating off-channel rearing, forage, and refuge habitat in the lower Puyallup River watershed, which will benefit Puyallup River fish stocks.

The DSAY credits allow for calculating the functional equivalency of off-channel habitat created at the Bank for use in compensating for marine or freshwater impacts within the DSAY service area. Through discussion with NMFS and other expert agencies comprising or contributing to the IRT, the marine limits of the service area extend 0.25 miles (1,320 feet) from the shoreline and were developed based on the likelihood of Puyallup salmonid stocks being the primary stocks within the area. According to Simenstad (2000), "juvenile salmonids migrating through the Puyallup River Delta and Commencement Bay originate from 12 basic stocks," all but two of these stocks must migrate through the lower Puyallup River near the Bank. Therefore, Puyallup River salmonid stocks are the primary stocks found within Commencement Bay. Based on this information, marine habitat within the service area includes the northeastern portion of Commencement Bay up to and including Tyee Marina (near the intersection of Marine View Drive and Slayden Road), the southeastern portion of Commencement Bay along the Port of Tacoma, and the southwestern shoreline of Commencement Bay up to Jack Hyde Park (near the intersection of Ruston Way and McCarver Street) as shown on Figure E2.

E4.0 USE OF CREDITS OUTSIDE THE SERVICE AREAS

The Bank may be used to compensate for permitted impacts occurring outside the service areas if specifically approved by the appropriate agencies requiring mitigation and the Corps and Ecology, following consultation with the IRT, provided that such mitigation would be practicable and environmentally preferable to other mitigation alternatives. As such, out-of-service-area impacts will only be allowed in special circumstances, which will be evaluated on a case-by-case basis (e.g., including, but not limited to, projects that span multiple basins such as transportation and utility corridors and pipelines, and settlement of enforcement actions).

E5.0 UNIVERSAL CREDIT-DEBIT RATIOS AND DSAY CREDIT USE

- A. Universal Credits or DSAY credits may be used, subject to the approval of the regulatory agencies with jurisdiction over the impact, to compensate for authorized permanent or temporary impacts, as well as to resolve enforcement or permit compliance actions such as replacing previously implemented project-specific mitigation that has partially or completely failed.
- B. Each credit withdrawal transaction agreement that is associated with a permit must indicate the permit number of the impacting project, date of permit issuance, the number of Universal Credits and/or DSAY credits transacted, and must expressly specify that the Sponsor, and its successors and assigns, assumes responsibility for accomplishment and maintenance of the permittee's compensatory mitigation requirements associated with the impacting project, upon completion of the credit transfer.

C. The following table (Table E1) depicts the approximate number of Universal Credits typically required by the IRT agencies to compensate for each unit of permanent loss of listed aquatic resource type and functional level. The actual number of Universal Credits required to compensate for an adverse impact to aquatic resources in any particular situation depends on many factors (e.g., whether the impact is permanent, indirect, or temporary) and will be determined on a case-by-case basis by the regulatory agency(ies) authorizing the impact. The wetland functional categories are based on the Washington State Wetland Rating System for Western Washington, 2014 Update (Ecology Publication #04-06-029). Units of loss are measured in acres for wetland and buffer impacts. Due to the typically high level of functioning of Category I wetlands, compensation for impacts to these resources by Universal Credits will be determined by the regulatory agencies on a case-by-case basis.

TABLE E1. CREDIT-DEBIT RATIOS FOR AQUATIC RESOURCE IMPACTS AT THE BANK

Resource Impact	Bank Credits: Impact Acreage				
Wetland, Category I	Case-by-Case				
Wetland, Category II	1.2:1				
Wetland, Category III	1:1				
Wetland, Category IV	0.85:1				

D. Impacts to streams, wetlands, marine environments, or other aquatic resources that permanently, indirectly and/or temporarily impact ESA listed or threatened fish species, non-listed or resident fish species or habitat will be calculated using HEA Model and the habitat values NMFS used to calculate the total Bank DSAY credits. Permit applicants may use the Bank's HEA habitat values to calculate debit DSAYs with NMFS concurrence after consultation with the affected Tribes and those regulatory agencies with jurisdiction. Applicants and regulatory agencies may use DSAY credits on a case-by-case basis, with NMFS concurrence after review and oversight by the affected Tribes and/or regulatory agency reviewing the project with knowledge of the project impacts, including the location, amount and type of impact that is occurring to fish species or their habitat.

E6.0 USE OF UNIVERSAL CREDITS FOR CRITICAL AREA BUFFER MITIGATION BY LOCAL JURISDICTIONS

Impacts to Critical Area buffers for wetlands, streams, lakes, marine environments and other areas regulated by local jurisdictions within the Bank Universal Credit service area, including Pierce County, King County, and the City of Tacoma can be mitigated by use of Universal Credits with the approval of the appropriate regulatory agencies. Since one Universal Credit is generated for every 5 acres of forested upland buffer restoration, a ratio of "0.2:1" for Critical Area buffer impacts results in a "1:1" ratio for area on the ground of permitted buffer impact to buffer restoration at the Bank. Buffer rules vary in every situation so the amount of Universal Credit required in each permit situation can be determined on a case-by-case basis by the regulatory agency reviewing the project according to local regulations.

E7.0 PROCEDURES FOR USE OF MITIGATION BANK CREDITS

A. <u>Use of Mitigation Bank Credits</u>. Public and private proponents of activities regulated under Sections 401 and 404 of the Clean Water Act (33 U.S. Code §§ 1341, 1344), Section 10 of the Rivers and

Harbors Act of 1899 (33 U.S. Code § 403), Endangered Species Act (16 USC §§ 1531 et seq.), Magnuson-Stevens Fishery Conservation and Management Act (16 USC §§ 1801 et seq.) Washington State Water Pollution Control Act (Chapter 90.48, RCW), Shoreline Management Act (RCW 90.58), Growth Management Act (RCW 36.70A), Hydraulic Code (RCW 75.20), and other Federal, State, and local authorities may be eligible to use the Bank as mitigation for unavoidable impacts. The Bank will be eligible to serve public and private end users by providing advance compensatory mitigation for authorized impacts to regulated areas that require mitigation to settle enforcement claims. The Bank is intended to provide replacement of lost functions and values including: wetlands, streams, endangered species habitat, riparian habitat, and open water habitat, marine habitat, and upland/buffer habitat.

- B. An applicant seeking a permit for a project with unavoidable adverse impacts to the aquatic environment within the service area must generally obtain the approval of each regulatory agency with jurisdiction over that project in order to use the Bank as a source of compensatory mitigation. To receive approval to use the Bank, the applicant must demonstrate to the satisfaction of the pertinent regulatory agencies that the project complies with all applicable requirements pertaining to alternatives and mitigation sequencing, and that purchasing credits from the Bank for compensatory mitigation would be in the best interest of the environment. Specifically, a permit applicant must generally be able to demonstrate to the satisfaction of the involved regulatory agencies that:
 - 1. There is no practicable less environmentally damaging alternative to adversely impacting the aquatic resource, critical area, buffer, animal species, or other regulated area; and
 - 2. All appropriate and practicable measures to minimize adverse impacts to the aquatic ecosystem have been demonstrated and included in the project.

It is solely the determination of the agency(ies) permitting the project with adverse impacts as to whether a proposed use of Universal credits within the service area is appropriate and environmentally preferable to other mitigation alternatives.

- C. An applicant seeking to use DSAY credits from the Bank will generally follow these steps during a project review and permitting process:
 - A project applicant and the involved regulatory agency(ies) determine that a proposed project will
 have unavoidable impacts to an ESA listed fish species and/or its designated critical habitat or to
 non-listed fish species (or its habitat), or a state species of concern, in accordance with a project's
 ESA Section 7 Consultation if necessary.
 - 2. It is determined by the project applicant and/or regulatory agency(ies) as applicable that compensatory mitigation to offset the impacts to fish and/or its habitat is required or appropriate.
 - 3. The applicant must request and the regulatory agency(ies) must determine (with NMFS concurrence) that utilizing DSAY credits from the Bank would be appropriate compensatory mitigation for all or part of the project impacts and if the project is within the DSAY service area of the Bank project.
 - 4. The Applicant contacts the Bank Sponsor to determine if DSAY credits are available from the Bank.
 - 5. The applicant or its representative, in coordination with regulatory agency(ies) as applicable, uses HEA to assess project impacts and determine appropriate numbers of Bank credits. During this process, the applicant will utilize the Bank HEA guidance for habitat definitions and their associated

- values for the impacting project. The Bank HEA guidance and calculation spreadsheet is available through the Bank Sponsor and the Services and is found in the Bank Project Resource Folder.
- 6. The appropriate amount of DSAY credits are then proposed to be debited from the Bank ledger as a condition of permit issuance where applicable, and in accordance with the applicant's Bank Use Plan.
- 7. Proof of DSAY credit transfer will be furnished via a DSAY credit issuance letter from the Bank Sponsor, stating the total amount of DSAY credits transferred to the project permit numbers. The transfer will be recorded on the Bank's credit ledger which is submitted to and held by the IRT Co-Chairs and the involved regulatory agency(ies). These documents will serve as confirmation that the appropriate amount of DSAY credits have been debited from the Bank and applied to the project to compensate for the project impacts. The credit transfer process is then complete.
- D. Upon receiving permission to utilize credits from the Bank, the permittee must contact the Sponsor to ensure that credits are available. Upon completion of the transaction, the Sponsor will inform the permitting or Regulatory agencies of each completed transaction, via email or letter with an attached copy of the accounting ledger.
- E. Other types of credit uses may include, but are not necessarily limited to, purchases made that will not be associated with a particular project or impact (i.e., "good will" purchase), purchases made by natural resource stewards resulting from expenditures from in-lieu-fee programs (or similar type funds), and other conservation purposes.
- F. The Sponsor may use the Bank to provide compensatory mitigation to offset impacts to environmental elements other than aquatic resources. Such use shall result in no physical changes to the Bank unless approved by the Corps, Ecology, acting with the concurrence of National Marine Fisheries Services (NMFS), in consultation with the IRT. The Sponsor must obtain approval from the Corps and Ecology, acting with the concurrence of NMFS, following consultation with the IRT, prior to establishing currencies other than the Universal Credits or DSAY credits that are established by Appendix D of this Instrument. The agencies that regulate those specific environmental elements are responsible for establishing the value of the currency and release schedules, and determining the appropriateness of using the Bank as compensatory mitigation for impacts to those elements. The Corps and Ecology, in consultation with the IRT, will determine how withdrawal of those currencies will affect the amount of potential Universal Credits and/or DSAY credits remaining (with NMFS concurrence when Fish Conservation Credits as involved). The Sponsor shall record the award and use of all currencies on the Bank ledger and otherwise follow the procedures as outlined in Section E8.0. Use of the Bank for compensatory mitigation for other environmental elements shall not conflict with the provisions of this Instrument.
- G. In some cases, through mitigation sequencing, the permitting agencies for an impacting project within the service area may require critical functions to be mitigated on-site at the impact location while other functions may be appropriately mitigated at the Bank ("decoupling"). Critical functions are those site-specific functions that the agencies have determined must be maintained on site.

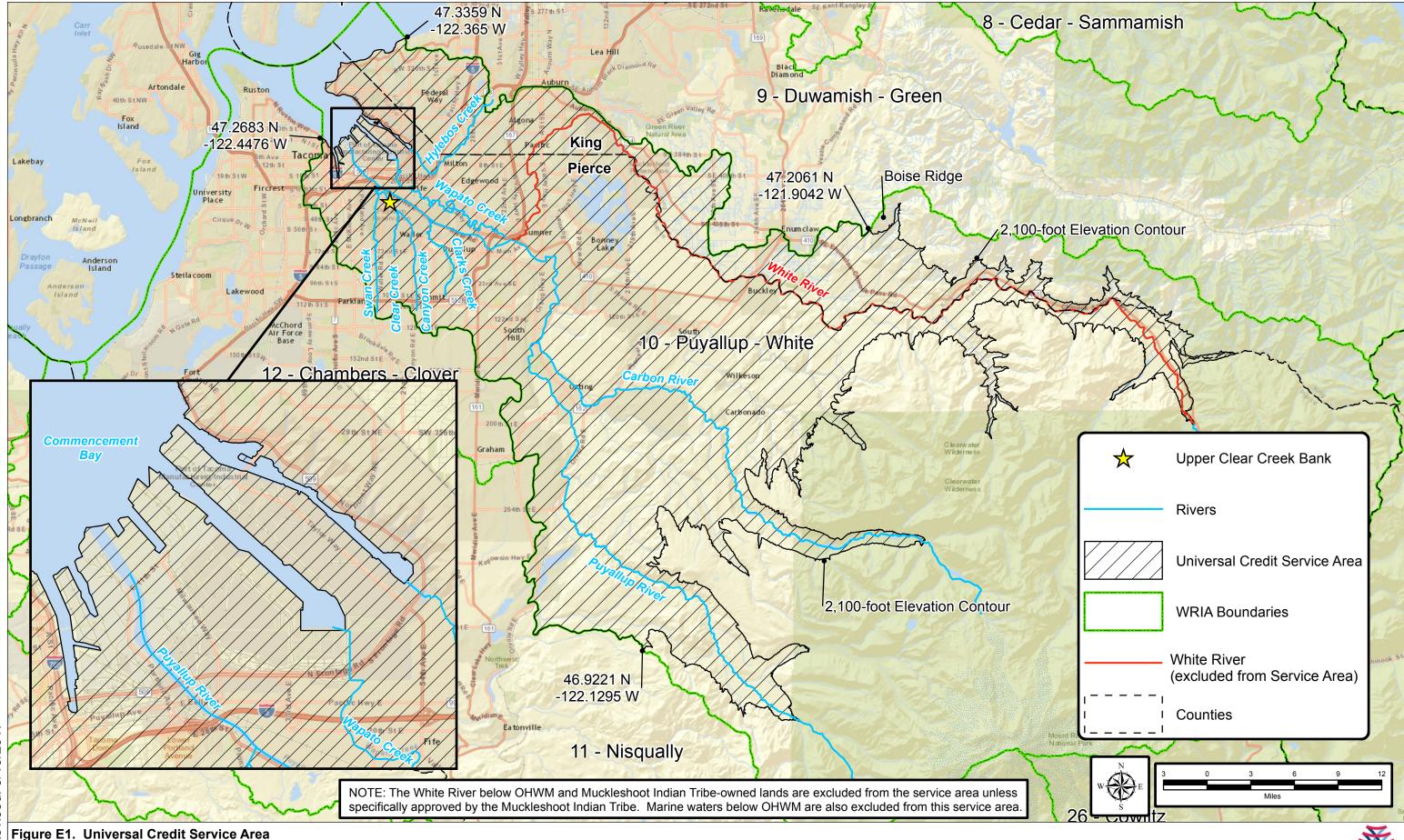
E8.0 ACCOUNTING PROCEDURES

- A. The Sponsor shall establish and maintain for inspection and reporting purposes a ledger of all credits that are awarded through the achievement of specified performance standards, as well as credits that are sold, used, or transferred. The Sponsor will record each credit withdrawal transaction that receives a permit with the Pierce County Auditor, and submit a copy of the recorded transaction to the IRT within 30 days from the stamped registration date.
- B. The ledger must follow the current ledger template approved by the Corps and Ecology. The following information, at a minimum, will be recorded in the ledger for each transaction:
 - 1. Date of transaction.
 - 2. Amount and type of credits transacted.
 - 3. For credits awarded, reference the performance standard(s) to which the awarded credits correspond.
 - 4. For credit sales/use/transfers, include the name, address, and telephone number of purchaser/user/transferee, and include all the following information that applies: permit number(s), permit issuance date, and name of the regulatory agency(ies) requiring permits; location of the project for which the credits are being purchased/used/transferred; the size of the impacts; and a brief description of the project impacts requiring compensatory mitigation (e.g., nature and quality of aquatic resources affected).
 - 5. For credits withdrawn from the ledger for reasons other than credit sale/use/transfer, include the specific reason for withdrawal.
 - 6. Bank credit balance of each credit type after the award or transaction.
- C. The Sponsor will provide an updated ledger to the IRT each time credits are awarded, sold, used, or otherwise transferred. This must be provided within 30 days of any credit transaction. The Sponsor will also submit an annual ledger by February 1 of each year. The annual ledger must show a cumulative tabulation of all credit transactions at the Bank through December 31. This ledger will be submitted in conjunction with the monitoring reports until: (1) all credits have been awarded and sold, used, transferred, or otherwise withdrawn; or (2) the Corps and Ecology, in consultation with the IRT, have approved the Sponsor's written request to permanently cease banking activity.

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Tacoma

Notes: The locations of all features shown are approximate. This drawing is for information purposes. It is intended to assist in showing features discussed in the attached document. Neither the Port of Tacoma nor any of it's staff or consultants (GeoEngineers) makes any warranty of any kind for this information, express or implied, including but not limited to any warranties or merchantability or fitness for a particular purpose, nor shall the distribution of this information constitute any warranty.



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APPENDIX F

Establishment Period Monitoring, Reporting, Maintenance and Remedial Action

Appendix F. Establishment Period Monitoring, Reporting, Maintenance and Remedial Action

During the establishment period, the Sponsor shall monitor and report on the progress of the Bank toward achieving the goals, objectives, and performance standards established by these Appendices and take all actions directed by the Corps and/or Ecology, following consultation with the IRT, to remediate any consideration that prevents a component of the Bank from achieving the goals, objectives, and performance standards of the Bank. Procedures for as-built reports, monitoring reports and remedial actions are described below.

F1.0 AS-BUILT REPORTS

As-built reports will be submitted to the IRT upon the completion of construction to verify topography, hydrology, habitat features, and planting. The as-built drawings shall be signed and stamped by a licensed surveyor at 1-foot elevation topographic intervals. This may be one report that describes all construction, or it may be separated into two reports that are submitted at different times, one following grading and related construction, the other following completion of planting. At a minimum, the following components should be included in one or both (as appropriate) of the as-built reports:

- Name and contact information for the parties responsible for the Bank construction including the Bank Sponsor, engineers, and wetland professional on site during construction
- Ecology, Corps, and Local permit numbers
- Dates when activities began and ended such as grading, removal of invasive plants, installing plants, and installing habitat features
- Photographs of the site at as-built conditions taken from photo stations (panoramic photos are recommended)
- Description of any problems encountered and solutions implemented (with reasons for changes) during construction of the Bank
- List of any follow-up actions needed with a schedule
- 11x17 maps of the Bank showing:
 - Topography with 1-foot contours surveyed and stamped by a licensed surveyor. Include a description of how elevations were determined. Based on size of site and complexity of design, Sponsor may be required to submit an overview map and multiple individual maps that adequately show the Bank details.
 - Installed planting schemes (vegetation communities/habitat types) quantities, densities, sizes, approximate locations/extents, and the sources of plant material
 - Locations of dataloggers and staff gauges that remain after construction
 - Locations of habitat features
 - Locations of permanent photo stations

Date when the maps were produced and, if applicable, when information was collected.

As-built reports will be submitted to each member of the IRT within 90 days after completion of construction, or 90 days after execution of the Instrument, whichever is later, and must demonstrate compliance with Appendix B and any modifications to the Bank development plan and design, approved by the Corps and Ecology prior to their construction or implementation, following consultation with the other members of the IRT.

Permanent photo points will be established in Year 0 to document the progression of each habitat type. Photo point locations will be documented in the as-built report. A Mitigation Bank construction manager will document Year 0 post-construction conditions in the as-built report for grading, plantings, large woody material (LWM) and other habitat features; and will include photographs and as-built drawings. The as-built reports will also establish baseline conditions for future monitoring.

F2.0 ESTABLISHMENT PERIOD MONITORING

A performance monitoring program will be implemented to determine the degree of success of the mitigation effort during the establishment period. Monitoring will include periodic surveys and site evaluations to establish the foundation on which the Bank can demonstrate to the IRT that pertinent performance standards have been achieved and continue to be maintained. Monitoring will include measurements and observations of site stabilization, wetland hydrology, vegetative cover, plant survival, vegetation structure, species composition, and fish and wildlife observations, specifically fish presence in the created aquatic habitat areas.

F2.1 Overview of Monitoring Requirements

As-built and on-going monitoring requirements specific to each performance standard (see Section C2.0 of Appendix C) are summarized below.

Objective 2 – Hydrology

Re-establish wetland hydrology and create fish accessible aquatic habitat. Rehabilitate hydrologic connection between the channel system and floodplain wetlands, and create topographic complexity to support varied hydrologic regimes.

- Submit as-built drawings and photographs showing completed grading per the approved plan (Performance Standard 2A).
- Conduct annual hydrologic water elevation data in Years 1, 2, 3, 4, 5, 7, and 10 documenting saturation or inundation of floodplain wetlands and inundation of created channels, outlet channel, PAB ponds, alcoves, and channel benches. Report in Years 1, 3, 5, 7, and 10 (Performance Standard 2B).
- Submit wetland determination in Year 3 (Performance Standard 2C).
- Submit monitoring results of diversion structure conditions and functioning, and minimum width and depth of floodplain channels. Report in Years 1, 3, 5, 7, and 10 (Performance Standard 2B).
- Conduct wetland delineations in Years 5 and 10, and submit delineation reports documenting wetland acreage, hydrology, vegetation, and soil development (Performance Standard 2D).

Objective 3 - Vegetation

Remove residential and agricultural activities, invasive species, and establish native wetland vegetation communities comparable to pre-agricultural conditions on the site and in accordance with the targeted hydrologic regimes across the site.

For All Habitat Types On Site

- Submit as-built showing completed planting including species list, plant quantities, plant sizes, plant spacing and density, seeding rate, and final planted acreages of vegetative community types (Performance Standard 3A).
- Submit monitoring reports for Years 1, 3, 5, 7, and 10 documenting non-native invasive species presence and percent cover (Performance Standard 3B).
- Submit monitoring reports for Years 1, 3, 5, 7, and 10 documenting reed canarygrass (*Phalaris arundinacea*) presence and percent cover (Performance Standard 3C).
- Submit monitoring reports for aggressive non-native invasive species including non-native knotweed (*Polygonum* spp.), purple loosestrife (*Lythrum* salicaria), and English ivy (*Hedera helix*), presence and eradication reported in monitoring reports for Years 1, 3, 5, 7, and 10 (Performance Standard 3D).

For Emergent Floodplain Wetland Mosaic Habitat Type (PEM)

■ Submit monitoring reports in Years 1, 3, 5, 7, and 10 documenting native emergent plant species percent cover within palustrine emergent (PEM) wetland habitat (Performance Standard 3E).

For Scrub-shrub Floodplain Wetland Mosaic Habitat Type (PSS)

Submit monitoring reports in Years 1, 3, 5, 7, and 10 documenting percent cover by native trees and shrubs within palustrine scrub-shrub (PSS) wetland habitat (Performance Standard 3F).

For Forest Floodplain Wetland Mosaic Habitat Type (PFO)

- Submit monitoring reports in Years 1, 3, 5, 7, and 10 documenting native tree and shrub percent cover (Performance Standard 3G).
- Submit monitoring reports in years 3, 5, 7, and 10 documenting native tree density (Performance Standard 3H).

For Existing Forest Floodplain Wetland Habitat Type (Existing PFO)

■ Submit monitoring reports in Years 1, 3, 5, 7, and 10 documenting native tree canopy cover in Existing PFO (Performance Standard 3I).

For Palustrine Aquatic Bed Habitat (PAB)

 Submit monitoring reports in Years 5, 7, and 10 documenting native aquatic bed vegetation percent cover (Performance Standard 3J)

For Forested Upland and Forested Hummocks (UPL)

Submit monitoring reports in Years 1, 3, 5, 7, and 10 documenting native tree and shrub presence and percent cover (Performance Standard 3K).

For Forested Hummocks

Submit monitoring reports in Years 1, 3, 5, 7, and 10 documenting native tree and shrub presence and percent cover (Performance Standard 3L).

Objective 4 - Fish and Wildlife Habitat

- Submit as-built report showing locations of habitat features (performance standard 4A).
- Submit monitoring report in Year 10 documenting numbers and locations of existing habitat features (Performance Standard 4B).
- Submit monitoring reports in Years 1, 3, and 7 documenting the presence/absence survey results for juvenile salmonids (Performance Standard 4C).
- Submit monitoring reports in Years 1, 3, 5, 7, and 10 documenting the survey results for the presence of any adult salmon (Performance Standard 4D).

F2.2 Monitoring Protocol

Formal monitoring will occur throughout Years 1, 2, 3, 4, 5, 7, and 10 and informal monitoring will be conducted each year. Both formal and informal monitoring will be documented in formal monitoring reports in Years 1, 3, 5, 7, and 10. Formal monitoring will include both qualitative and quantitative monitoring to address fulfillment of the Bank objectives and performance standards in Appendix C according to the monitoring schedule and sampling protocol described below. Informal monitoring provides a general overview of site progress to ensure that the site appears to be progressing towards meeting performance standards. Informal monitoring will usually include observation notes and site photos. Informal monitoring may quantitatively address some performance standards for upcoming years, but may be less statistically rigorous than formal monitoring.

Year 0 is the year during which construction is completed and the as-built report is submitted by the Sponsor and approved by the IRT. Year 1 is the first year of site monitoring following construction. In addition, during site visits, general site conditions and maintenance needs (trash/vandalism, fences, etc.) and wildlife presence and use of the site will be noted. Wetland hydrology will be measured in the areas intended to be wetland during Year 3. For Years 5 and 10, formal monitoring will include a full wetland delineation of the entire Bank area.

Photo points will be established in areas that will provide general vantage points around the margin of the Bank, vantage points within the Bank, and at specific monitoring locations such as hydrology monitoring locations, representative vegetation sampling points, or habitat features, in sufficient numbers to give a visual representation of onsite conditions. Location of photo points will be recorded by hand-held GPS and marked in the field using wood or metal stakes.

Informal monitoring will be the only monitoring method during the years for which there are no performance standards. Informal monitoring observations will be documented in the formal monitoring reports in Years 1, 3, 5, 7, and 10. Informal observations will also be made during monitoring years 1,3, 5, 7, and 10 to augment formal monitoring results.

F2.2.1 Vegetation

A stratified random sampling approach as described in Elzinga et al. (1998) will be used to collect data to assess attainment of performance standards related to vegetation (Performance Standards 3B through 3L). Vegetation communities (strata) on the site are: Forest Floodplain Wetland Mosaic, Existing Forest Floodplain Wetland, Scrub-Shrub Floodplain Wetland Mosaic, Emergent Floodplain Wetland Mosaic, Palustrine Aquatic Bed, Forested Upland, and Forest Hummock.

The performance standards address PFO, Existing PFO, PSS, PEM, PAB, Forested Upland, and Forest Hummock vegetation communities separately. Each vegetation community will be treated as a separate stratum to the extent possible. Each individual plot will be assigned to a vegetation community (PFO, Existing PFO, Forest Hummock, PSS, PEM, UPL) at the time of monitoring based on as-built conditions. If both PEM and woody vegetation are present in the same plot, then the plot will be based on the dominant vegetation community contained in the majority of the plot and monitored accordingly and/or be moved in a direction to fully encapsulate whatever vegetation community is being monitored for the plot. Additional plots may be added during field monitoring at the biologist's discretion. If a plot has to be adjusted by length or width in the vegetation community, the biologist will note that in field notes and within the monitoring report. If the monitoring methodology as written does not accurately inform the IRT about the successes or failures of a particular habitat area even though it may be thriving or failing, the Bank Sponsor will coordinate with the IRT about changing the monitoring approach, which performance standards to apply in those areas or how existing performance standards could be modified.

Using AutoCAD, a grid pattern was generated to fit the Bank and overlaid onto each corresponding vegetation community (PFO, Existing PFO, PSS, PEM, forest hummock, and UPL) as defined on the final as-built planting plan. The length and distance of grid-pattern lines and intersections were evenly spaced over each vegetation community at distances able to generate an adequate number of potential monitoring points within each community. Grid-pattern line intersections falling within the vegetation community were utilized, while intersections falling outside the vegetation community were discarded. Potential monitoring points were identified at each grid pattern line intersection. Within each vegetation community, all gridpattern line intersections were assigned numbers and monitoring points were randomly selected using a random number generator, utilizing that number set. The number of randomly generated monitoring points are dependent on the monitoring protocols for that vegetation community being sampled. A minimum of 1% of the total acreage of PSS, PFO, Existing PFO, Forest Hummock, and UPL vegetation communities will be sampled and a minimum of 6 plots per acre of the PEM habitats will be sampled. The coordinates of each random monitoring plot location have been compiled using the computer program AutoCAD Civil 3D. In addition, the random plot locations were evaluated to confirm that they are relatively evenly distributed across individual vegetation communities and across the Bank to ensure representative sampling of the entire Bank. If deemed necessary, alternate random plots will be substituted to avoid over-sampling (plot clusters) or under-sampling of portions of the vegetation communities. During the course of the monitoring period, additional plots may be added if deemed necessary by Sponsor or the Corps and Ecology, after consultation with the Sponsor and the IRT, to better represent the condition and establishment of the vegetation communities. Monitoring plot coordinates will then be entered into a hand held Global Positioning System (GPS) unit and located in the field.

Plot locations will be field-verified, and if a plot is identified as unusable during field sampling, (e.g., lies in the middle of an access path) another randomly located plot will be substituted. Monitoring points are shown on Figure F1. Final plot locations will be shown on site maps in monitoring reports and the same plot locations will be sampled during each monitoring period.

Sampling plots are established to measure species presence and percent cover of vegetation to identify site progress in meeting performance standards. Where it occurs in a sample plot, bare soil percentage will be identified separately from vegetation within the overall percent cover. "Cover" is used in this MBI to mean the actual proportion of the ground surface of the sample plot that is covered by a vertical projection of foliage (by single species or defined group of species) as viewed from above (or below for taller shrubs

and trees), or by bare substrate. Minimum sampling requirements are established by the acreage of each habitat type, where at least 1% of the area of each forested and shrub habitat type (PFO, Existing PFO, PSS, PAB, forest hummock, and UPL) is sampled, and a minimum of 6 plots per acre are sampled in the herbaceous habitat types (PEM). The minimum sampling area and sampling methods for each habitat type were identified based on methods described in Tiner (1999) and Krebs (1999) with exceptions described below, and revised in consultation with the IRT. The sampling requirements for forest hummock and PAB vegetation communities were established through consultation with the IRT, which are; one entire hummock within each vegetation community and one half of each PAB pond, respectively as shown on Figure F1.

Vegetation in aquatic bed communities will be conducted through visual observation of vegetation species and percent cover. Visual observation will be conducted by wading into the PAB pond (depth permitting) or using an underwater camera to identify vegetation species and estimate percent cover. Percent cover estimates will be made through collecting measurements of areas containing PAB vegetation and collecting density estimates for PAB vegetation in these areas. The density estimate will be multiplied by the calculated areas estimate and compared to the overall PAB area size to estimate the overall PAB vegetation percent cover.

Sample Plot Sizes

<u>Forested and Shrub-Scrub communities (PFO, Existing PFO, PSS, and Forested Upland)</u> shall be sampled with a 12-foot-radius circle (area of the sample plot equals 452 square feet).

<u>Herbaceous communities (PEM)</u> shall be sampled with a 3-foot-radius circle (area of the sample plot equals 28.3 square feet).

<u>Aquatic Bed communities (PAB)</u> shall be sampled as one-half of each PAB pond (area varies based on PAB pond size) using field verification.

Forest Hummocks shall be sampled as the entire hummock (area varies based on hummock size).

Additional sample plots may be added if deemed necessary by the Sponsor or by the IRT. All monitoring plot location will be shown on maps in the monitoring reports.

TABLE F1. SAMPLE PLOTS BY AREA AND INSTALLED VEGETATION COMMUNITY

Area/ Installed		Minimum Sa	ample Plots	Required	Proposed Number of Sample Plots			
Vegetation Community	Acreage	PFO/PSS/ UPL	PEM	PAB/ Hummock	PFO/PSS/ UPL	PEM	PAB/ Hummock	
Scrub-Shrub Floodplain Wetland Mosaic (PSS)	5.92	6			10			
Emergent Floodplain Wetland Mosaic (PEM)	1.94	-	12		-	15		
Forest Floodplain Wetland Mosaic (PFO)	5.01	5		-	6			
Existing Forest Floodplain (Existing PFO)	10.36	10			10			
Aquatic Bed Pond (PAB)	0.88	-	-	1	-	-	2	
Forest Hummock	1.56			1		-	4	
Forested Upland (UPL)	1.61	2	-	-	3	-		
Totals:	27.28*	23	12	2	29	1 5	6	

Notes:

For all vegetation communities, non-native invasive species presence and percent cover will be documented in monitoring reports as recorded at each sampling plot for Years 1, 3, 5, 7, and 10. The cover of reed canarygrass, Himalayan blackberry, scotch broom, tansy ragwort, Canada thistle, and bull thistle shall be documented separately for each vegetation community, and reported in monitoring reports for Years 1, 3, 5, 7, and 10. There shall be zero tolerance for Japanese knotweed (and related hybrids), purple loosestrife, and English Ivy on site. Presence of these species will be recorded in each sampling plot, and throughout the Bank. Presence and eradication of these species must be noted in monitoring reports for Years 1, 3, 5, 7, and 10. Annual surveys for these species shall occur. Locations and extent of the invasive species will be observed and noted throughout the Bank during monitoring visits, and that information will be reported ASAP to the site maintenance manager.

Monitoring for vegetation will be conducted towards the end of summer, but prior to leaf drop – usually between mid-August and mid-September. In order to count toward achievement of performance standards, plants must have been in the ground for a minimum of 5 months prior to monitoring.

^{* -} Total Bank acres in this table does not include 1.36 acres of Bank channels and alcoves.

F2.2.2 Hydrology

Hydrology monitoring will be conducted in accordance with the monitoring schedule to compare results against the project objectives and performance standards (Table C2). Shallow groundwater monitoring wells equipped with hydrologic monitoring devices (pressure transducers) or stream gauges have been installed in each of the following habitat areas on the Bank (Figure F1):

- Floodplain channel (3 locations)
- Channel bench (1 location)
- Alcove (2 locations)
- PAB Pond (1 location)
- Floodplain wetland re-establishment area (1 location)

Pressure transducers will be programmed to log ground and surface water elevation data once per hour. In addition, to evaluate overall conditions, water depths in multiple habitats will be measured during site visits conducted to download data from pressure transducers (approximately four visits per year). Wells or stream gauges will be re-installed if they become damaged and are no longer functioning. If a different habitat is formed due to natural processes (e.g., channel migration or avulsion) where a well or stream gauge is located, the well or stream gauge will be re-installed at another representative location of the same habitat type that was originally being monitored. The rationale for the relocation of the well or stream gauge and its new location will be described in the monitoring report, and will be shown on the site map.

The presence and functioning conditions of the two deflector structures, and the minimum width and depth of the floodplain channels will also be monitored to document proper functions and fish passage throughout the monitoring period (Performance Standard 2B).

Hydrologic data collected from pressure transducers in Years 0, 1, 2 and 3 will be used in the wetland hydrology determination in Year 3 to measure the attainment of performance standard 2C, "a minimum of 26 acres of the site will have wetland hydrology present at 3 years". In addition to the data collected from the pressure transducers, shallow soil pits will be located across the site during the Year 3 wetland hydrology determination to provide additional documentation of wetland hydrology and hydric soil development above and beyond pressure transducer data (Performance Standard 2C)

Shallow soil pits (20 inches in depth) are intended to document the presence of shallow groundwater, saturated soils, and hydric soil development that would support wetland conditions, which may not be captured by pressure transducers. Wetland hydrology for the project site is defined as pressure transducer readings, soil saturation to the surface, or free water in the soil pits, demonstrating water at 12 inches or less below the soil surface for at least 30 consecutive days during the growing season, where the growing season is defined in the 1987 Corps of Engineers Wetland Delineation Manual (U.S. Army Corps of Engineers, 1987) and appropriate supplements. If performance standards are not met, further data collection will be conducted, as necessary.

For Year 3, formal monitoring will include a wetland hydrology determination which includes spot checking in the areas that are intended to be wetland to determine if site characteristics related to the extent and duration of wetland hydrology are establishing. The areas that have been checked for wetland characteristics will be shown on a determination map. For Years 5 and 10, formal monitoring will include a

full wetland delineation of the entire site, using the 1987 Corps of Engineers Wetland Delineation Manual (U.S. Army Corps of Engineers, 1987) and appropriate Supplement. The wetland edge will be clearly marked in the field by a qualified wetland biologist. The wetland edge, channels, channel benches, PAB ponds, and alcoves will be surveyed and mapped by a licensed land surveyor. A GPS-based survey method is acceptable as long as it has sub-meter accuracy. Computer-aided drawing software will be used to calculate the size of each wetland area after the determination and delineation have been completed. The results of the wetland delineations, including data sheets and a wetland boundary map with data points and acreages, will be included in the Years 5 and 10 monitoring reports.

Hydrologic data collected from the pressure transducers will also provide relevant information for wetland delineations conducted in Years 5 and 10 at the site (Performance Standard 2D). In addition to pressure transducer data, hydrologic data will be collected from shallow groundwater monitoring wells (24 inches in depth) during the growing seasons of Years 5 and 10 to inform the wetland delineations at those times. The shallow groundwater monitoring wells will be installed and monitored according to Corps guidance: ERDC TN-WRAP-05-2 June 2005.

Photo points will be established at each permanent hydrologic monitoring point. Data and photo points for hydrology shall include those locations with permanent dataloggers as well as two to three additional locations that will allow for representative shallow soil pit sampling in each area intended to be wetland as approved by the IRT. At a minimum, data collected from permanent data/photo points shall be reported during Years 1, 3, 5, 7, and 10. All hydrology monitoring results shall be reported in applicable monitoring reports.

F2.2.3 Fish and Wildlife Monitoring

The location of features intended for wildlife use on the site will be recorded on the final as-built (Performance Standard 4A). Wildlife features include LWM structures (bank roughening, channel roughening, instream meander roughening, hummock roughening, wetland roughening, and standing snags) and hummocks. Locations and condition of wildlife habitat features will also be documented in Year 10 (Performance Standard 4B). Although there are no performance standards for terrestrial and amphibian species, monitoring reports will include observations of wildlife use of the site. Anecdotal observations of wildlife use, including types of wildlife and/or their sign, will be recorded while on site for other monitoring purposes.

Juvenile fish presence/absence surveys (Performance Standard 4C) will occur in the Spring of Years 1, 3, and 7 within the constructed channels and reported on in corresponding monitoring reports. Adult fish presence surveys (Performance Standard 4D) will occur in the Fall/Winter of Years 1, 3, 5, 7, and 10 within the constructed channels and reported in corresponding monitoring reports. Fish presence monitoring will be timed based on the known seasonal life stage events and corresponding Clear Creek flow events which trigger adult and juvenile migration. Visual and/or photo documentation of juvenile and adult salmon will occur during each corresponding fish survey monitoring year. Potential species include Chinook (Oncorhynchus tshawytscha), coho (O. kisutch), chum (O. keta), and pink (O. gorbuscha) salmon and steelhead (O. mykiss) and coastal cutthroat (O. clarki) trout. After Year 1, in coordination with NMFS, USFWS, WDFW, and affected tribes if it is determined that electrofishing, fyke traps, or other sampling method is necessary to achieve greater quantitative understanding of fish use in the Bank, an application for a research permit from NOAA will be submitted to provide for incidental take allowance, such that this technique can be applied in Years 3, and 7 of fish monitoring.

Walking visual surveys (Performance Standard 2B) will be conducted in conjunction with adult fish presence surveys. Walking visual surveys will be accomplished by walking one bank of the stream channels to visual observe fish presence, the presence and function of the two diversion structures, and a minimum six-inch depth and 18-inch width within at least one route through the Bank.

F3.0 REPORTS

The Sponsor or their consultant will prepare and submit to the IRT monitoring reports that will inform the IRT of the status of Bank establishment and operation as shown in Table F2. The reports will include the name of the entity responsible for preparing the report, the names of the individuals who gathered the data and who authored the report, and will include a summary table comparing relevant performance standards for that years report to monitoring results. These reports will document Bank conditions and provide the supporting information required to document the attainment of goals, objectives, and performance standards, as a basis for a decision whether to award credits. Monitoring reports for each calendar year will be submitted by March 1 of the following year, with a copy for each member of the IRT. Each monitoring report will contain the following information:

- A. An overview of the current ecological condition of the Bank, including a survey of the vegetative communities, effectiveness of the restoration activities accomplished to date, and progress of the Bank in achieving the specific performance standards of the Bank. To provide data for evaluating progress towards achievement of performance standards, vegetation plots, hydrologic monitoring points and photo points will be established at selected locations within the Bank to evaluate relevant performance standards. Vegetation data in forested, scrub-shrub, emergent, aquatic bed, and upland areas will include species presence, cover, and density as identified in individual performance standards. IRT approved vegetation monitoring measures and techniques will be used to demonstrate whether performance standards are being met. Experience in the field may indicate that other performance monitoring methods would provide more useful information; the Corps and Ecology, following consultation with the IRT, must approve in advance any changes in the means of gathering or reporting performance data. All monitoring will be conducted by qualified personnel. The data will be summarized in the monitoring reports using tables and/or graphs, and raw data used for compiling the summary will be located in an appendix to the report for reference. The monitoring report will also contain tables which list the applicable performance standards for the monitoring year, and whether or not the performance standards was met, along with any corrective actions proposed.
- B. A detailed discussion about the likely cause and impact of any setback or failure that occurred and recommendations for future actions and strategies that might resolve those problems.
- C. Pertinent additional information on such monitoring aspects of the Bank as hydrology, soils, vegetation, fish and wildlife use of the area, recreational and scientific use of the Bank site, and natural events such as disease, wildfire, and flooding that occurred.
- D. Observations of general site conditions, with recommendations for specific maintenance activities (e.g., trash removal; repairs to fences and habitat features; locations and invasive species for weed control actions; replanting species and locations; protective measures from herbivores; etc.) to keep the Bank on track to achieving its performance standards and ecological goals.

- E. Explanations of the need for any contingency or remedial measures, and detailed proposals for their implementation.
- F. Photographs of the Bank taken from permanent locations that are accurately identified on the as-built drawings. The photographs are intended to document the progress of each component of the Bank, as well as the Bank in general, toward achieving the objectives and performance standards of the Bank site. Such photo-monitoring will include general vantage points around the margin of the Bank site, vantage points within the Bank site, and at specific monitoring locations such as representative sampling points or habitat features.
- G. The report will include maps showing locations of vegetation monitoring plots, vegetation communities, photo points, hydrology monitoring sites (data loggers, staff gauges, piezometers), hydrology habitats (floodplain channels, channel benches, and alcoves), etc. In the appendix, the report will include (at a minimum) monitoring methods, site photos, and raw data from vegetation plots.

TABLE F2. SUMMARY OF ANNUAL MONITORING TASKS

Monitoring Year and Report Name	Performance Standard	Monitoring Task	Monitoring Area	Expected Site Visits		
	2A	Submit of grading as-built	Entire Bank	90 days after completion of		
Year 0 As- built Report	ЗА	Submit of planting as-built	Entire Bank	construction, or 90 days after execution of the Instrument, whichever is		
	4A	Submit of habitat features as-built	Entire Bank	later		
	2B	Collect hydrology data	Entire Bank	Multiple, March-June		
Year 1 Monitoring Report	2В	Collect diversion structure and fish passage minimum width/depth information	Diversion structures and floodplain channels	Multiple		
	3B, 3C, 3D ¹	Monitor for non-native invasive species	Entire Bank	June-Sept, one time in year		
	3E, 3F, 3G, 3K, 3L	Collect cover data for native species	PEM, Existing PFO Areas	Aug-Sept, one time in year		
	4C	Perform juvenile fish presence/absence surveys	In constructed fish habitat	Two surveys between Feb and June. Consult with NOAA and WDFW on additional survey methods and timing		
	4D	Document use by adult salmon	In constructed fish habitat	Two surveys, Fall/Winter		
Year 2 (No report)	2B	Collect hydrology data	Entire Bank	Multiple, March-June		
	2В	Collect diversion structure and fish passage minimum width/depth information	Diversion structures and floodplain channels	Multiple		

TABLE F2. SUMMARY OF ANNUAL MONITORING TASKS (CONTINUED)

Monitoring Year and Report Name	Performance Standard	Monitoring Task	Monitoring Area	Expected Site Visits		
	2B, 2C	Collect hydrology data	Entire Bank	Multiple, March-June		
	2В	Collect diversion structure and fish passage minimum width/depth information	Diversion structures and floodplain channels	Multiple		
	3B, 3C, 3D ¹	Monitor for non-native invasive species	In each habitat class	June-Sept, one time in year		
Year 3 Monitoring	3E, 3F, 3G, 3I, 3K, 3L	Collect cover data for native species	In each habitat class	Aug-Sept, one time in year		
Report	ЗН	Document native tree density	In PFO habitat	Aug-Sept, one time in year		
	4C	Perform juvenile fish presence/absence surveys	In constructed fish habitat	Two surveys between Feb and June. Consult with NOAA and WDFW on additional survey methods and timing		
	4D	Document use by adult salmon	In constructed fish habitat	Two surveys, Fall/Winter		
Year 4 (No report)	2B	Collect hydrology data	Entire Bank	Multiple, March-June		
	2B	Collect hydrology data	Entire Bank	Multiple, March-June		
	2В	Collect diversion structure and fish passage minimum width/depth information	Diversion structures and floodplain channels	Multiple		
Year 5	2D	Submit wetland delineation	Entire Bank	March – June, one time in year		
Monitoring Report	3B, 3C, 3D ¹	Monitor for non-native invasive species	In each habitat class	June-Sept, one time in year		
	3E, 3F, 3G, 3I, 3J, 3K, 3L	Collect cover data for native species	In each habitat class	Aug-Sept, one time in year		
	ЗН	Document native tree density	In PFO habitat	Aug-Sept, one time in year		
	4D	Document use by adult salmon	In constructed fish habitat	Two surveys, Fall/Winter		

TABLE F2. SUMMARY OF ANNUAL MONITORING TASKS (CONTINUED)

Monitoring Year and Report Name	Performance Standard	Monitoring Task	Monitoring Area	Expected Site Visits		
	2В	Collect hydrology data	Entire Bank	Multiple, March-June		
	2В	Collect diversion structure and fish passage minimum width/depth information	Diversion structures and floodplain channels	Multiple		
	3B, 3C, 3D ¹	Monitor for non-native invasive species	In each habitat class	June-Sept, one time in year		
Year 7 Monitoring	3E, 3F, 3G, 3I, 3J, 3K, 3L	Collect cover data for native species	In each habitat class	Aug-Sept, one time in year		
Report	ЗН	Document native tree density	In PFO habitat	Aug-Sept, one time in year		
	4C	Perform juvenile fish presence/absence surveys	In constructed fish habitat	Two surveys between Feb and June. Consult with NOAA and WDFW on additional survey methods and timing		
	4D	Document use by adult salmon	In constructed fish habitat	Two surveys, Fall/Winter		
	2В	Collect hydrology data	Entire Bank	Multiple, March-June		
	2В	Collect diversion structure and fish passage minimum width/depth information	Diversion structures and floodplain channels	Multiple		
	2D	Submit final wetland delineation	Entire Bank	March – June, one time in year		
Year 10 Monitoring	3B, 3C, 3D ¹	Monitor for non-native invasive species	In each habitat class	June-Sept, one time in year		
Report	3E, 3F, 3G, 3I, 3J, 3K, 3L	Collect cover data for native species	In each habitat	Aug-Sept, one time in year		
	ЗН	Document native tree density	In PFO habitat	Aug-Sept, one time in year		
	4B	Document numbers and locations of habitat features	Entire Bank	June-Sept, one time in year		
	4D	Document use by adult salmon	In constructed fish habitat	Two surveys, Fall/Winter		

Note:

¹⁾ Performance Standard 3D will be inventoried annually and results will be reported in Years 1, 3, 5, 7, and 10.

F4.0 REMEDIAL ACTION DURING THE ESTABLISHMENT PERIOD OF THE BANK

In the event that one or more components of the Bank do not achieve performance standards or comply with any other requirement of this Instrument, the following sequence of remedial actions will be taken.

- A. If the monitoring reports, or inspection by representatives of the IRT agencies, indicate persistent failure to achieve and maintain the prescribed performance standards, the Sponsor will propose adaptive management actions to correct the shortcomings and will submit an adaptive management plan to the Corps and Ecology. A thorough analysis of vegetation, wetland, stream, and fish habitat monitoring data may result in the identification of other factors, not identified in the performance standards or monitoring data, causing the project to fall short of its objectives. The Corps and/or Ecology, following consultation with the IRT and the Sponsor, may also direct adaptive management actions if the Corps and/or Ecology identify a need for corrective action and no adaptive management plan acceptable to the IRT has been submitted within a reasonable period of time. The adaptive management plan shall specify the nature of further examination of areas for potential causes of failure and/or corrective action to be conducted, the schedule of completion for those activities, and a monitoring plan for assessing the effectiveness of the corrective action(s). The objective of the adaptive management plan shall be to attain the originally prescribed Bank objectives, either through achieving the original performance standards or through achieving new standards subsequently developed based on evaluation of the Bank site as it matures and is assessed. The Sponsor shall also implement all appropriate mitigation that the Corps and/or Ecology, in consultation with the IRT, determine is reasonably necessary to compensate for those authorized impacts to the aquatic environment that have not been successfully redressed by the Bank pursuant to the requirements of this Instrument. If modified or replacement performance standards are proposed, the Sponsor may not initiate activities designed to achieve those replacement standards until those performance standards are approved by the Corps and/or Ecology, following consultation with the IRT. During the period that a specific component of the Bank is out of compliance, the Corps and/or Ecology, following consultation with the IRT, may direct that credits generated by that Bank component may not be sold, used, or otherwise transferred.
- B. If remedial actions taken by the Sponsor under the provisions of the preceding paragraph do not bring that performance standard of the Bank into compliance with the requirements of this Instrument, including any approved changes to the Instrument, the Sponsor may request approval to discontinue efforts to achieve one or more performance standards for the Bank. If the Corps and Ecology, following consultation with the IRT, approve of the proposal to discontinue efforts to achieve one or more performance standards, they need not be accomplished but no additional credits may be awarded for those performance standard(s). At the discretion of the Corps and Ecology, following consultation with the IRT, the Sponsor may also be released from future maintenance and monitoring obligations for those performance standard(s), provided that releasing the Sponsor from those obligations does not adversely affect the remainder of the Bank, or affect credits already sold, used, or transferred to date.
- C. If the Corps and Ecology, following consultation with the IRT, determine that the failure of one or more performance standards of the Bank to comply with the requirements of this Instrument adversely affects the ability of the Bank to achieve its goals or objectives, or if the Sponsor does not make a reasonable effort to bring the Bank into compliance with this Instrument, the Corps and Ecology, following consultation with the IRT, may terminate this Instrument and the operation of the Bank pursuant to Article IV.J.

F5.0 MAINTENANCE DURING THE ESTABLISHMENT PERIOD OF THE BANK

General maintenance will be performed throughout the year to address conditions that may limit the success of the Bank and attainment of performance standards and objectives. The Sponsor is responsible for all site maintenance activities throughout the establishment period of the Bank. Maintenance activities will include, but are not limited to, vegetative maintenance (including replanting, repair of any areas subject to erosion, weed control around plantings, mowing, control of invasive species, control and discouragement of voles, beaver and deer foraging on plants) and general maintenance (including fence repair and clean-up of trash).

F6.0 REFERENCES

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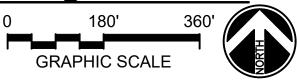
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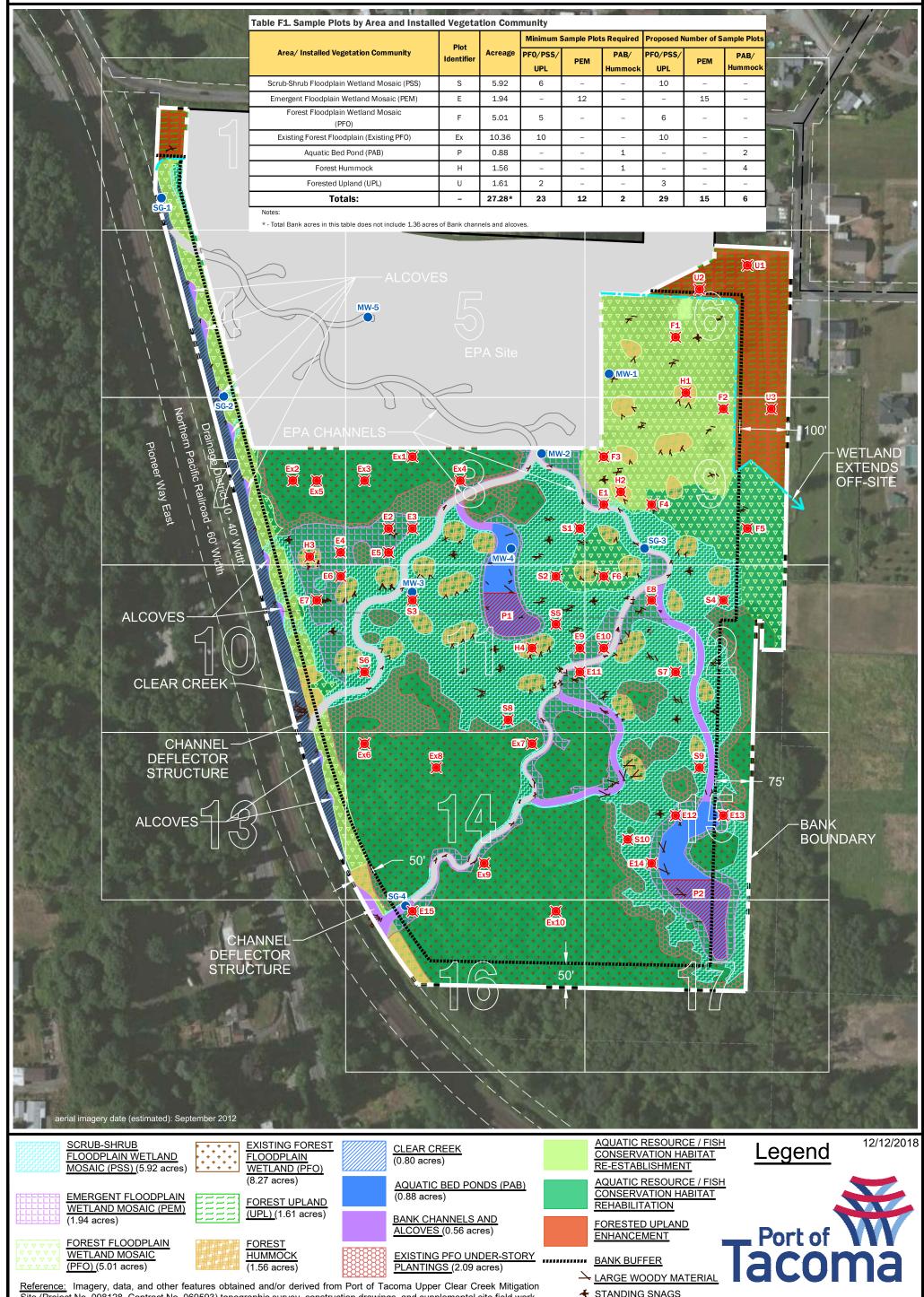
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United States Army Corps of Engineers. 1987. "Corps of Engineers Wetlands Delineation Manual" Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Figure F1: Hydrology and Vegetation Monitoring Locations

Note: The locations of all features shown are approximate. This Figure is for informational purposes only and is intended to assist in showing features discussed in the attached document. Neither the Port of Tacoma nor any of it's staff or consultants makes any warranty of any kind for this information, express or implied, including but not limited to to any warranties or merchantability or fitness for a particular purpose, nor shall the distribution of this information constitute any warranty. Bank buffers are subject to change if permanent protection mechanisms are secured





PLANTINGS (2.09 acres)

→ LARGE WOODY MATERIAL

★ STANDING SNAGS

Reference: Imagery, data, and other features obtained and/or derived from Port of Tacoma Upper Clear Creek Mitigation

APPENDIX G Long Term Protection and Management

Appendix G. Long-Term Protection and Management

G1.0 CONSERVATION EASEMENT

- A. The Sponsor will ensure, pursuant to Article III.D. of this Instrument, that an appropriate conservation easement is granted and recorded dedicating in perpetuity the property constituting the Bank, that is to be re-established, rehabilitated, or enhanced for credit. This conservation easement must be approved by the Corps and Ecology, following consultation with the IRT, and shall be recorded with the Pierce County Auditor. A copy of the recorded easement shall be provided to all members of the IRT. The conservation easement shall reflect that it may not be removed, modified, or transferred without written approval of the Corps and Ecology, in consultation with the IRT. The Corps and Ecology may consider any alteration or rescission of the conservation easement a default of the Sponsor's obligations under this Instrument and may institute appropriate action pursuant to Article IV.J. The Sponsor shall provide no less than 60 days written notice to the IRT of any transfer of fee title or any portion of the ownership interest in the Bank real property to another party. Use prohibitions reflected in the easement will preclude the site from being used for activities that would be incompatible with the establishment and operation of the Bank. All restrictions shall be granted in perpetuity without encumbrances or other reservations, except those encumbrances or reservations (e.g., retention of recreation and privileges by the landowners and their guests) approved by the Corps and Ecology and not adversely affecting the ecological viability of the Bank. Any portion of the site not encumbered by the conservation easement will not be credited for use in the Bank.
- B. The conservation easement shall provide that all structures, facilities, and improvements within the Bank, including roads, trails and fences, that are merely incidental to the functionality of the mitigation site but are necessary to the Bank management and maintenance activities, shall be maintained by the Sponsor or its assignee for as long as it is necessary to serve the needs of long-term management and maintenance. All structures, facilities and improvements that directly and substantially contribute to the functionality of the mitigation site will be included within the responsibilities delineated in the Long-Term Management and Maintenance Plan.

G2.0 LONG-TERM MANAGEMENT AND MAINTENANCE PLAN

A. The Sponsor is responsible for ensuring that a Long-Term Management and Maintenance Plan is developed and implemented to protect and maintain in perpetuity the aquatic functions and values of the Bank site. This Plan must be approved by the Corps and Ecology, following consultation with the IRT, prior to the termination of the establishment period of the Bank. Once the establishment period of the Bank has terminated pursuant to Article IV.K. of this Instrument, pursuant to a Long-Term Management and Maintenance Agreement the Sponsor will assume responsibility for implementing that Plan, as provided in Article IV.M.1 of this Instrument, unless the Sponsor assigns this responsibility pursuant to the provisions of Article IV.M.2 and Section G2.0.D of this Appendix. The Long-Term Steward will enter into a Long-Term Management and Maintenance Agreement with the Corps and Ecology, which will document the commitment on the part of the Long-Term Steward to adhere to the Long-Term Management and Maintenance Plan as well as memorialize the approval of the Long-Term Management and Maintenance Plan by the Corps and Ecology.

- B. To gain IRT approval, the Long-Term Management and Maintenance Plan will consist of enumerated objectives. The Bank will document that it is achieving each objective by submitting status reports to the IRT on a schedule approved by the IRT. A primary goal of the Bank is to create a self-sustaining natural aquatic system that achieves the intended level of aquatic ecosystem functionality with minimal human intervention, including long-term site maintenance. As such, natural changes to the vegetative community, other than changes caused by noxious weeds, that occur after all Bank performance standards have been met are not expected to require remediation.
- C. The Long-Term Management and Maintenance Plan will include those elements necessary to provide long-term protection for the aquatic ecosystem and habitat resources of the Bank site. The specific elements of the Plan must be tailored to meet the specific protection needs of the site. At minimum, the IRT will likely find the following core elements to be necessary for inclusion in the Long-Term Management and Maintenance Plan. The particular characteristics of the Bank at the end of the establishment period may necessitate including other elements not specified below, that are needed to protect the ecosystem resources present at the Bank.
 - 1. Periodically patrol the Bank for signs of trespass and vandalism. Maintenance will include reasonable actions to deter trespass and repair vandalized Bank features.
 - 2. Monitor the condition of structural elements and facilities of the Bank site such as signage, fencing, roads, and trails. The Long-Term Management and Maintenance Plan will include provisions to maintain and repair these improvements as necessary to achieve the objectives and functional performance goals of the Bank and comply with the provisions of the conservation easement. Improvements that are no longer needed to facilitate or protect the ecological function of the Bank site may be removed or abandoned if consistent with the terms and conditions of the conservation easement.
 - 3. Inspect the Bank annually to locate and eradicate any occurrence of invasive knotweed (*Polygonum* spp and hybrids). The IRT anticipates that this long-term control will involve identifying and eradicating a relatively small number of recurrences each year. In the event the Corps and Ecology, in consultation with the IRT, determines that the watershed within which the Bank is located becomes infested with knotweed in the future, so that its effective control on the Bank is either no longer practicable or unreasonably expensive, the IRT will consider appropriate changes to the Long-Term Management and Maintenance Plan.
 - 4. Inspect the sites annually to locate and control noxious weeds other than knotweed. Noxious weed control measures may include mechanical vegetation control, herbicide treatments, and temporary plantings.
- D. If the Sponsor elects to request the approval of the IRT to assign long-term management and maintenance to a Long-Term Steward pursuant to Article IV.M.2, the long-term management and maintenance assignment agreement will reflect that the assignee has assumed (1) the obligation, owed to the IRT and manifested through execution of a Long-Term Management and Maintenance Agreement with the Corps and Ecology, of accomplishing the Long-Term Management and Maintenance Plan; as well as (2) the legal responsibility for continued accomplishment and maintenance of the compensatory mitigation requirements associated with all impacting projects that satisfied their mitigation requirements through the application of Bank credits. The Corps and Ecology will also execute this assignment agreement. In the event of such an assignment, a Long-Term Management

and Maintenance Endowment	Fund	must	be	established	by	the	Sponsor	and	transferred	to the
Long-Term Steward.										